MBER 1951

FACTORY

ANAGEMENT AND MAINTENANCE

FEINSINGER

BULLEN

DUNLOP

AARON

COMAN

HEPBURN

What kind of men are your...

HALL

HERON

OLANDER

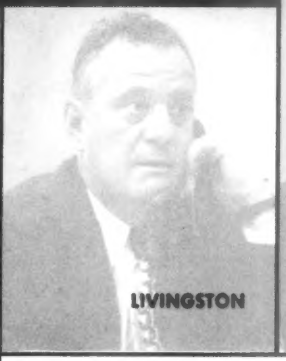
ARMSTRONG

SMITH

WAGE POLICY MAKERS? PAGE 84

DOHERTY

BIRTHRIGHT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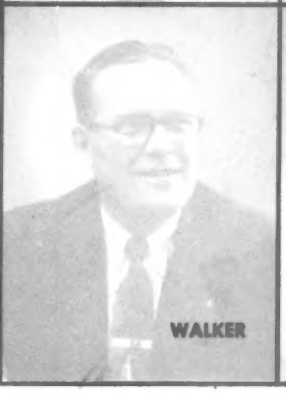
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BEIRNE

BATES

RIEVE

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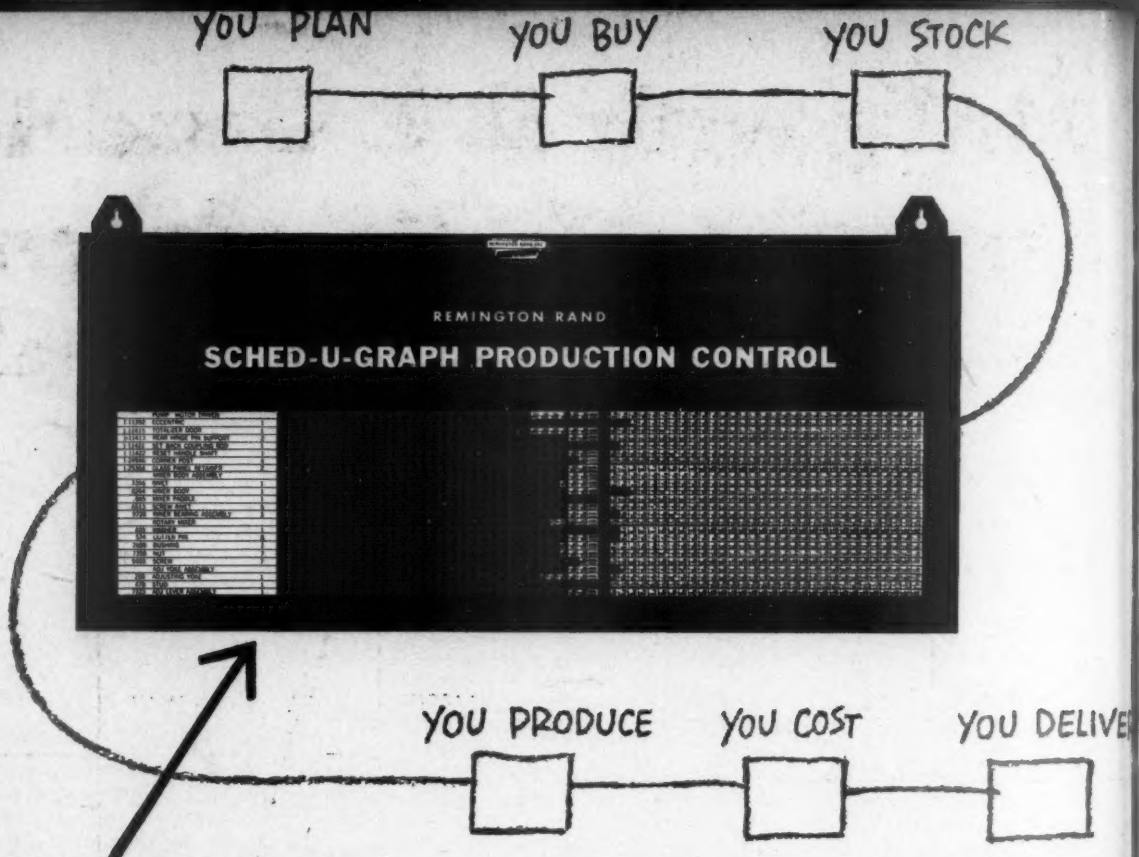


...but here's where you make-or-break your schedule

Just look below. You'll see why production men swear by Remington Rand Sched-U-Graph. This down-to-earth device *shows* you, graphically, how close each job is to schedule — *in time to take action if action is needed.*

Sched-U-Graph helped plants do "the impossible" in World War II. It is helping them again today . . . on all types of production and machine load problems. We'll rush without obligation our 32-page Sched-U-Graph Handbook (KD 341) if you'll just phone or write: Room 1468, 315 Fourth Ave., N.Y. 10. **Remington Rand Inc.**

here's how Sched-U-Graph Production Control works

Top line on this Sched-U-Graph represents a pump assembly — each line below, one component part. On each line is recorded, in advance, each day's production quota and the total to date. The sliding bar signals show work actually completed. The black vertical line is today's date, and shows how much work should be done. In this case, all components but one — the totalizer door — are on or ahead of schedule, but the whole assembly is delayed. You see the delinquent in a flash, and know exactly where corrective action is needed.

	PUMP—MOTOR DRIVEN	
1-11392	ECCENTRIC	1
1-11415	TOTALIZER DOOR	1
1-11413	REAR HINGE PIN SUPPORT	2
1-11421	SET-BACK COUPLING ROD	1
1-11422	RESET HANDLE SHAFT	1
1-24946	CORNER POST	4
1-25364	GLASS PANEL RETAINER	2
	MIXER BODY ASSEMBLY	
3356	RIVET	1
8264	MIXER BODY	1

Delay on this one part is holding up the assembly

Only with B. F. Goodrich grommet belts can you make these savings!

Save 3 ways! Investigate today! Write or mail coupon

You save belt costs because belts last longer, save production costs because machines keep running with fewer interruptions, save maintenance costs because they need less attention.

Patented grommet belts by B. F. Goodrich represent the only basic change since invention of the V belt. Belts last 20 to 50 per cent longer, depending on service. (The more severe the service, the greater the increase over ordinary belts.) Grommet belts have more rubber; they're more flexible, give better grip, less slip.

What is a grommet?

A grommet is like a giant cable except that it's *endless*—a cord loop built up by winding heavy cord on itself. There is no overlapping cord *section* as in all ordinary belts. Most belt failures occur in these sections where cords overlap!

All cords put to work

Each of the two grommets and every part of a grommet carry their share of the load. In ordinary belts under high tension the center cords "dish" because tension is greater near the driving faces. Dished cords are doing less work, not pulling their share. Grommet belts have no center cords, there is no dishing—therefore much more strength in proportion to cord volume—and less stretch. Grommet belts stretch, on an average, only about one-third as much as ordinary belts.

Better grip, less slip

Grommet belts have more rubber in relation to belt size. Without any stiff overlap, they're more flexible, grip pulleys better. Size for size, grommet belts give ⅓ more gripping power, pull heavier loads with a higher safety factor. Because there is less slip, there is also less surface wear.

Send for proof

Send the coupon for a set of reports telling users' experiences and showing actual installations where grommet belts outlasted all others. Some typical cases:

". . . within a few days ordinary belts had stretched . . . After six months of 24-hour-a-day service BFG grommet belts haven't stretched at all . . ."

"Ordinary belts lasted only 5 or 6 weeks . . . B. F. Goodrich grommet belts are in their sixth month of service . . ."

"Previous belts suffered from shock loads, wore out fast . . . BFG grommet belts have been in service 2 years with no shut-downs . . ."

There are hundreds of cases like these.

They cost no more

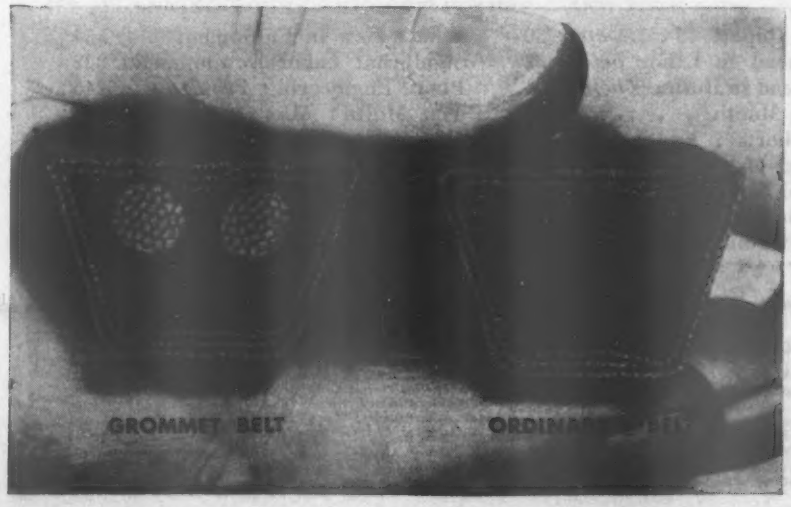
BFG grommet belts cost not one cent more than others. The savings they make for you are clear profit. They are made in C, D and E sections. They are patented by B. F. Goodrich. No other V belt is a grommet belt (U. S. Patent No. 2,233,294).

Write, send the coupon or see your B. F. Goodrich distributor. (He will show you his "X-ray" belt that shows the grommet construction clearly.)

Grommet V Belts BY

B.F.Goodrich

FIRST IN RUBBER



The B. F. Goodrich Company
Dept. FM-11
Akron, Ohio

☐ Send set of reports telling users' experiences and showing actual installations proving that B. F. Goodrich grommet belts outlast all others.

☐ Have distributor show me the "X-ray" belt that shows how B. F. Goodrich grommet belts are made.

Name_____

Firm Name_____

_____

Street Address_____

City_____

State_____

FACTORY
MANAGEMENT AND MAINTENANCE

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OF PLANT MANAGEMENT
FOR 59 YEARS

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ARE HIGHLIGHTED HERE ↓

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88 **THE WAGE BOARD SPEAKS IN ITS OWN DEFENSE.** Chairman Feinsinger says mistakes have been made, but the over-all job has been a good one. He also gives you some valuable clues about future activities of the board.

98 **LEHIGH STRUCTURAL STEEL SOLVED A HARD PROBLEM** the easy way. Two sets of wheels, one big, one small, carry the yard crane around a reverse curve. The installation cost only about 10% more than a straight-rail job.

100 **THEY SET A WOODEN HOUSE OVER A BURNING OIL PIT — BUT THE HOUSE DIDN'T BURN.** That was one of the tests of heat-retardant paints that made an expert say: "Every plant engineer should study this article — and put it to use."

104 **NO JOB IS TOO LITTLE FOR "BIG" PLANNING,** says Oran Company. The only yardstick is — will it pay off? The proof is in the pictures — time saved, labor saved, handling saved, with big equipment, bigger planning.

124 **PALLETS CAME TO THE RESCUE** when Willard wanted a better and cheaper way to handle storage batteries. If your product is tough to handle — and batteries are brutes — the answer is: Don't handle it — palletize. Here's how.

126 **HOW DO YOU GET MORE PARKING SPACE?** How do you assign it? How do you police it? How control traffic? Here's a summary of what 50 companies told FACTORY about the way they are solving their parking problems. *Plus a case history:* how Perfection Stove built a parking lot for 2½¢ a square foot.

132 **PLANNING YOUR COMPANY'S FUTURE — AND YOUR OWN** requires a keen knowledge of industry-by-industry growth prospects in the next decade. This analysis pinpoints the "most favored areas" reported in the over-all picture of industry prospects on page 108 of last month's issue.

COMING IN DECEMBER

THE CONTROLS YOU FACE IN 1952. We'll give you a complete run-down of every major production control, materials control, and wage control you'll have to live with. It'll give you your bearings as you enter the new year.

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Multiply your manpower with these new steel muscles

Thousands of plants are discovering how to lick manpower problems with new Osborn Brushing techniques. Let's find out how they can help *you!*

Machine-powered Osborn brushes are removing burrs from threads and other parts 3 to 10 times faster than former hand methods. They are doing product cleaning, finishing and many other operations in a matter of seconds. They release skilled manpower for other work and cut rejects to the minimum.

Whether your product is metal, rubber, plastic or fabric, it will pay you to call in the **O**sborn **B**rushing **A**nalyst to study your cleaning, deburring and finishing operations. He will recommend improvements with the latest Osborn power brushing techniques. Call or write *The Osborn Manufacturing Co., Dept. 565, 5401 Hamilton Ave., Cleveland 14, O.*

OSBORN

LOOK FOR THE NAME OSBORN . . . RECOGNIZED EVERYWHERE FOR QUALITY WORKMANSHIP AND MATERIALS

DEBURRING OUTPUT TRIPLED. That's the production increase in this plant using Osborn Power Brushing for the removal of burrs from clutch discs. And quality of finish is greatly improved.

FINISHING OUTPUT UP 20%. Osborn Power Brushing removes heat-treat discolorations and surface imperfections of these shafts prior to plating. Cut number of passes from two to one, increasing output 20%.

THIS IS "OSBORN". Our engineers . . . in the field and at the factory . . . have a vast fund of experience to help solve your cleaning and finishing problems. When you buy brushes with the name "OSBORN" you can be sure you are getting tools for unsurpassed production *results!*

Skilled Graybar personnel can often help you affect important savings in time and money when it comes to planning plant wiring projects.

For example, in the installation above, use of a special cable permitted a sharp increase in the current-carrying capacity of an existing – but inadequate – plant conduit system.

Similar technical advice is readily available to you through a near-by Graybar office or warehouse – as near, in fact, as your phone!

Don't let plant wiring projects snarl production –

Look behind the Graybar tag

tributor of more than 100,000 different electrical items, ybar offers you comprehensive service in meeting your uirements in the fields of lighting, communication, tilation, and power supply.

You'll find it's true – Graybar service *can* help you reduce down time and eliminate snarled production schedules while plant wiring projects are in progress. Schedule ahead – order *all* of the electrical materials for your next job from this friendly, all-inclusive source . . . you'll see for yourself.

Years of experience in planning all types of wiring installations stands behind the familiar Graybar tag – experience that means savings to you in meeting the particular supply requirements of any job.

Graybar distributes a complete line of wiring materials through a nation-wide network of strategically-located offices and warehouses. Every item is a first-quality product of a leading manufacturer. You get the *fastest possible* service from a Graybar office that's always close at hand. When shortages exist, we will work with you or your electrical contractor to select practical alternate materials and arrange for realistic delivery schedules. Remember, too, that the recommendations of a Graybar Inside Construction Specialist, supplementing those of your local Graybar Representative, will help accelerate project schedules from start to finish.

195-1111

GRAYBAR ELECTRIC COMPANY, INC.
***Executive Offices:* Graybar Building, New York 17, N. Y.**

Get convenience, service, reliability . . . via GraybaR

IN O
100 PRINCIPAL CI

B.F.Goodrich

HERE'S HELP...
on industrial tire and wheel problems

● You need two things for maximum industrial tire and wheel service:

(1) built-in tire quality and

(2) the *right* tire for the job.

With B. F. Goodrich, you get both of these factors:

In the first place, BFG's are built to give long, trouble-free service and maximum operating results.

Secondly, your local B. F. Goodrich dealer has been specially trained to give you a complete industrial Tire & Wheel Analysis service.

Here's how the TIRE AND WHEEL TW ANALYSIS PLAN helps you

Your B. F. Goodrich dealer will study your operation. He'll analyze loads, hauls, equipment, floors and hauling surfaces, and then make specific recommendations regarding tire and wheel types and sizes. He'll also offer maintenance suggestions you'll find extremely helpful. His recommendations are impartial because only BFG has a *complete* line of solids, semi-pneumatics and pneumatics. There's no obligation for this service . . . longer industrial tire life is yours for the asking.

A similar program is available for the manufacturers of industrial hauling equipment.

USE THE COUPON FOR FULL DETAILS OF THIS PLAN

The B. F. Goodrich Co.
Department TW-129
Akron, Ohio

Please give me additional information on your new Tire and Wheel Analysis plan.

Name_____

Title_____

Company_____

City_____ State_____

2 Palletized raw materials arriving at the plant are unloaded by Baker Trucks and transferred directly to storage.

3 Finished products are stored on pallet racks, providing access to all material without disturbing loads above.

1 To make the most of the 4800 square feet of plant storage space available, pallet loads of miscellaneous materials are stacked obliquely in some areas.

"...our present efficient and high-speed production could never have been achieved without our three Baker Trucks"

CASE HISTORY OF

Baker Trucks

at the DOBECKMUN CO.

CLEVELAND, O.

● Six years ago, anticipating a greatly increased volume, Dobeckmun bought its first Baker Truck —and paid for it out of its first six month's savings in handling costs. Since then, the company's business has quadrupled, and two more Baker Trucks have been added. Here is what *M. E. Horton, production manager,* says about their operation:

"Of all the multiple problems that face a plant manager in his hectic career, I'd say that one of the least troublesome for me has been material handling. When you consider that in recent years our volume has increased about 400%, it's hard to believe that we haven't made a single addition to our handling labor staff . . . We feel that our present efficient and high-speed production could never have been achieved without our three Baker Trucks. In fact, we're placing an order now for a fourth . . ."

For the complete story of Baker Trucks at the Dobeckmun Company, write for Case Study Report No. 351.

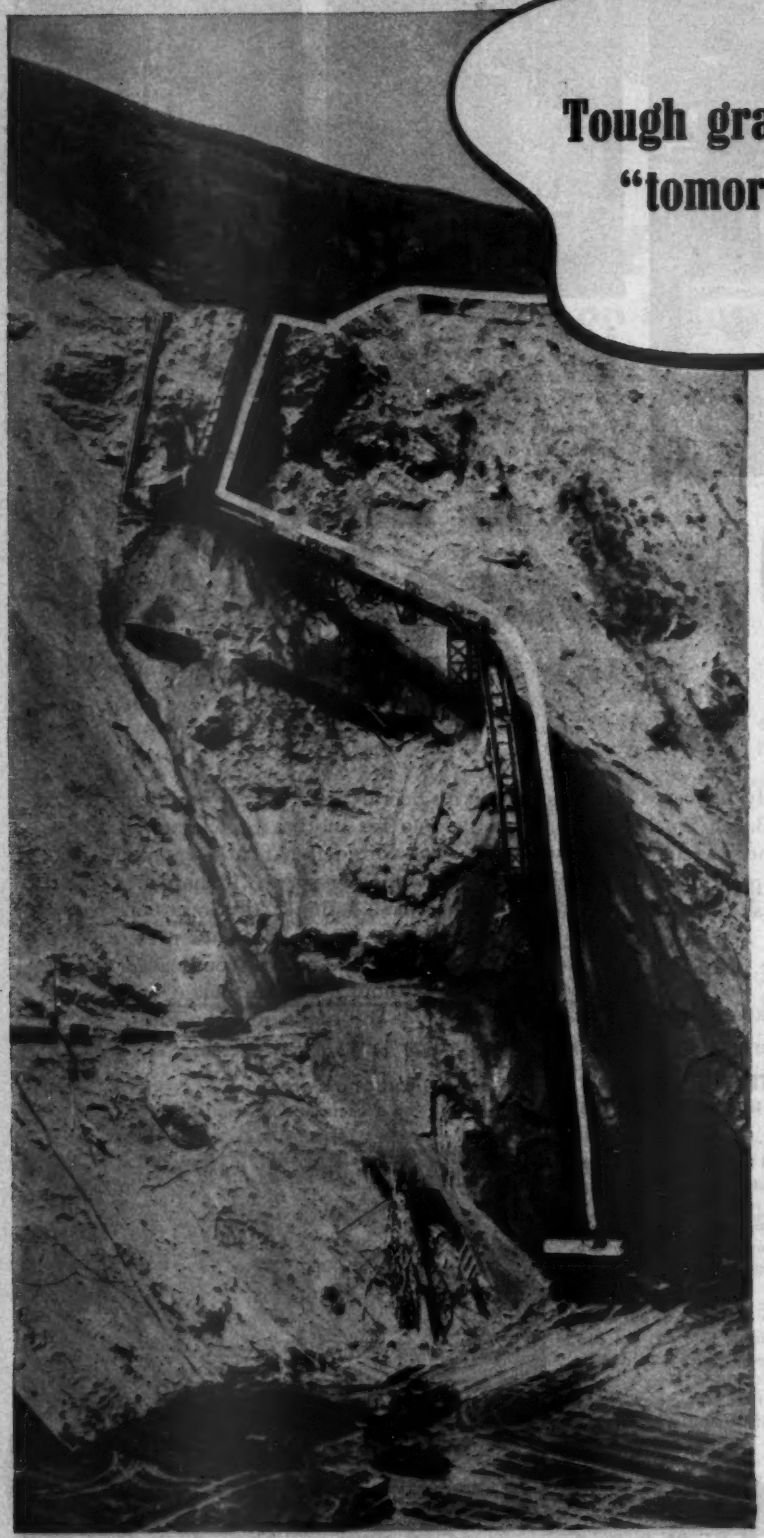
BAKER INDUSTRIAL TRUCK DIVISION *of The Baker-Raulang Company*
1218 WEST 80th STREET, CLEVELAND 2, OHIO • *In Canada: Railway and Power Engineering Corp., Ltd.*

4 Cartons of finished products are transferred from wrapping department to shipping storage on conveyors, where they are palletized for fork truck handling.

5 Rolls of paper, foil, plastic film, etc. are carried by truck to production machines. Electric trucks present no hazard to inflammable materials.

Baker® INDUSTRIAL TRUCKS

Tough grades won't stop "tomorrow's highways"!



This Link-Belt Belt Conveyor was chosen as the lowest-cost method of moving 5,000,000 yards of fill down a 900 ft. canyon. Rising costs of other methods of transportation have highlighted belt conveyor savings.

Belt-Conveyors . . . engineered and built by LINK-BELT . . . open new horizons in the economical transportation of bulk materials

UP AND DOWN or through mountains . . . over rivers and gullies — you'll find Link-Belt Belt Conveyors at work. Doing a top-flight job without any costly road bed, sub-grade or heavy structures to build and maintain.

Yes, for bulk materials handling, belt conveyors provide remarkable initial economies. And in many cases operation and maintenance cost far less than any other method of transportation.

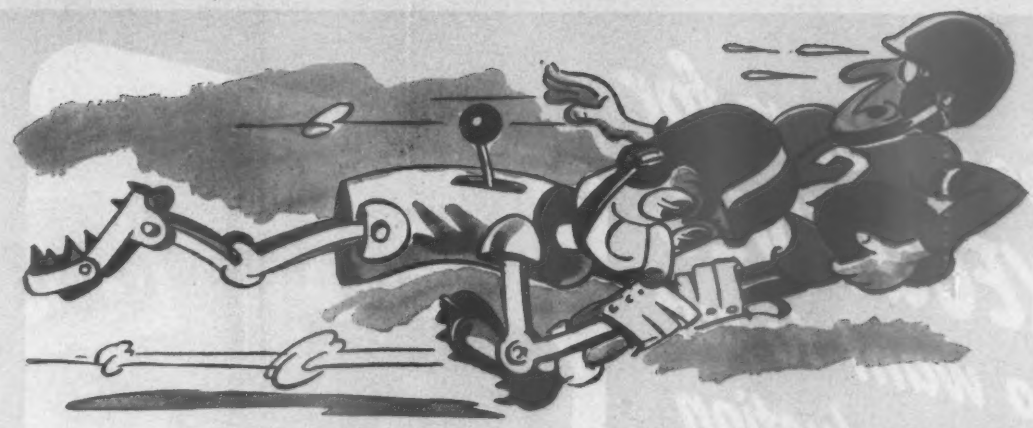
To get the best in belt conveyors, experienced operators come to Link-Belt. For Link-Belt makes all types and sizes of belt conveyor components. Backed by unmatched materials handling and power transmission experience, specialists help you get the *right* equipment for your requirements.

Not only on big construction projects, but in mines, mills, quarries — anywhere bulk materials must be moved — belt conveyors are truly the "highways of tomorrow." And, as in so many other fields, you'll find it pays to rely on Link-Belt.

LINK-BELT

One Source . . . One Responsibility for Materials Handling and Power Transmission Machinery

LINK-BELT COMPANY: Chicago 9, Indianapolis 6, Philadelphia 40, Atlanta, Houston 1, Minneapolis 5, San Francisco 24, Los Angeles 33, Seattle 4, Toronto 8, Springs (South Africa). Offices in Principal Cities. 12,539



Old Methods Can Throw You For a Loss!

METHODS OR MACHINERY for doing many of the jobs in your shop may have improved radically in just a few years . . . leaving you behind competition. In fact, you may never know what has happened until the day when sales suddenly become harder to make and competitors start taking jobs away from you.

Is there a new way . . . a better and more profitable way . . . of doing the job? If there is, you can't afford to wait.

Call an Allis-Chalmers representative. His experience covers an unusually wide range of equipment and methods because Allis-Chalmers builds major equipment for nearly every industry. He will be glad to help you, without obligation. Phone your nearby A-C District Office, or write Allis-Chalmers, Milwaukee 1, Wisconsin. A-3524A

Circle is an Allis-Chalmers trademark

IT PAYS TO KEEP PACE WITH MACHINERY PROGRESS

Circle Gyratory Sifter

All-metal construction of this new grain and chemical sifter means fast wash down with hot or cold water — without danger of warping. Handles high temperature materials safely.

Electronic Metal Detector

Costly and inefficient visual inspection can be replaced by a low-cost electronic Metal Detector. Catches stray metal in plastics, food, candy, tobacco, and pharmaceuticals. Eliminates human element!

Fin-Cooled Motors

Here's the motor that blows itself clean. Air blows over ribbed cast iron frame. Dirt can't build up to cause overheating. Is built in totally-enclosed fan-cooled and explosion-proof types.

ALLIS-CHALMERS

Good News for EXECUTIVES who want to cut production costs!

MODEL 480-P, one of 5 new Towmotors featured in "What Makes It Tick?"

"WHAT MAKES IT TICK?" features 5 New Towmotors—and describes many important Towmotor advantages.

- **AIR-COOLED CLUTCH**—*largest in the industry.*
- **POWERFUL HYDRAULIC BRAKES**—*hold capacity loads on steep inclines.*
- **DOUBLE UNIVERSAL JOINT**—*protects engine against shocks.*
- **HEAVY DUTY TRANSMISSION**—*most efficient type of drive ever produced.*
- **HOIST CYLINDER AND MAST**—*provide highest "free lift" in the industry.*
- **DOUBLE ACTING TILT JACKS**—*speed lifting and stacking.*
- **HYDRAULIC PUMP CONNECTED DIRECTLY TO DRIVE SHAFT**—*eliminates power waste.*
- **FULL FLOATING DRIVE AXLE**—*transmits power without carrying truck load.*
- **EXTRA HEAVY FRAME**—*one piece; continuously welded seams.*
- **HEAVY, INDUSTRIAL-TYPE ENGINES**—*designed especially for Towmotor.*

Now you can see, in your own office, an informative 15-minute sound slide film entitled "WHAT MAKES IT TICK?" . . . showing Towmotor engineering features that cut handling costs in all phases of Receiving, Processing, Storage and Distribution.

When you see "WHAT MAKES IT TICK?" you'll see *why* Towmotor is faster and more agile; you'll see *why* Towmotor maintenance and operating costs remain low and give many extra *years* of trouble-free service; you'll see WHY Towmotor operates 'round the clock on heavy handling jobs . . . cutting production costs as much as 60%.

Plan now to see "WHAT MAKES IT TICK?". To schedule a showing in your office at your convenience, SEND COUPON TODAY! No obligation.

TOWMOTOR
THE ONE-MAN-GANG®

FORK LIFT TRUCKS AND TRACTORS

RECEIVING • PROCESSING
STORAGE • DISTRIBUTION

TOWMOTOR CORPORATION
Div. 5, 1226 E. 152nd St., Cleveland 10, Ohio.

I would like to see "What Makes It Tick?"

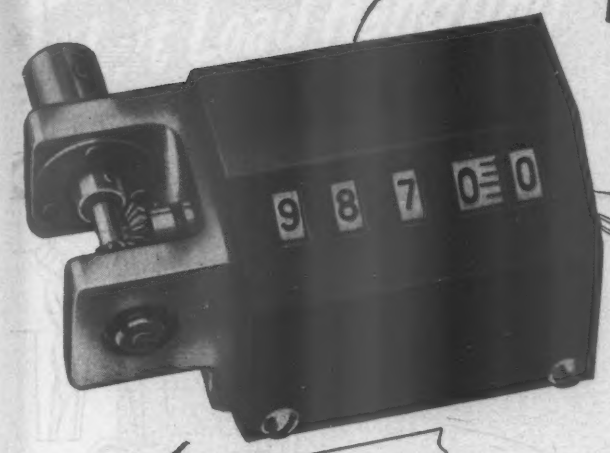
NAME _____

COMPANY _____

ADDRESS _____

CITY _____ STATE _____

*HOW MANY PEOPLE HAVE YOU TALKED TO ABOUT **AMERICANISM** TODAY?*



Radarmen Count on Veeder-Root for Indication of position...

Added Evidence that—

Everyone Can Count on VEEDER-ROOT

LONG-RANGE EYES are what you really have here, in these Veeder-Root High-Speed Yardage Counters.

And anything else you need in the way of *Count*rol, you can get in standard or special Veeder-Root Counters, mechanically or electrically operated . . . deliveries depending on D-O ratings, of course.

Just get in touch with the world's largest manufacturers of counting and computing devices. . . .

VEEDER-ROOT INCORPORATED
"The Name That Counts"
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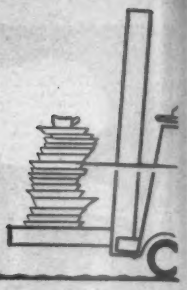
Montreal, Canada • Dundee, Scotland
Offices and agents in principal cities

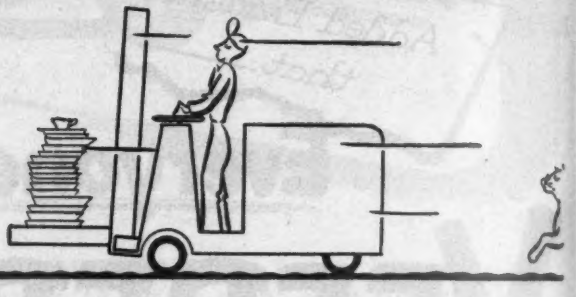
VEEDER-ROOT COUNTERS *"Count Everything on Earth"*

easy on loads
Mono-Cushions smooth out bumps, lend stability, reduce load breakage and spillage.

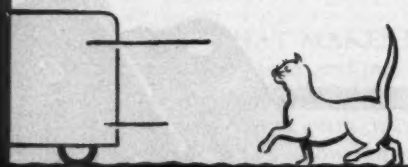


easy on drivers
Mono-Cushions steer easily, ride easily, handle beautifully, greatly reducing driver fatigue.

easy on vehicles
Mono-Cushions fairly soak up shock and shock load, reduce maintenance as much as 40%.



easy on floors
Easy-going Mono-Cushions roll gently, silently, over floor surfaces, reduce floor maintenance.



Mono-Cushions cut the cost of bumps

The manufacturer of your equipment can supply you, through his distributors, with Monarch Tires engineered for your equipment.

THE
MONARCH
RUBBER COMPANY
100 LINCOLN PARK • HARTVILLE, OHIO

SPECIALISTS IN INDUSTRIAL SOLID TIRES AND MOLDED MECHANICAL RUBBER GOODS

with ELWELL-PARKERS saves costly labor

As the first industrial truck manufacturer, Elwell-Parker was the pioneer in development of the Master Unit Load Principle. Elwell-Parker called it "Industrial Logistics"—showed shippers and railways how master unit loads, handled and *kept* on pallets or skids, moved goods faster, more cheaply, with less breakage, safely.

Your near-by E-P man, backed by Elwell-Parker's 44 years' leadership in this field, can help you profit to the utmost by unit load handling. From Elwell-Parker's 87 quality-built models, your E-P man can select exactly the right trucks for your needs. *Let us send him now!* The Elwell-Parker Electric Co., 4030 St. Clair Avenue, Cleveland 3, Ohio.

NEW GENERAL CATALOG
describes the complete E-P line in detail. Send for your copy *now.*

ELWELL-PARKER
POWER INDUSTRIAL TRUCKS
Established 1893

ONLY 5% OF PREVIOUS MAN-HOURS
A textile plant formerly loaded their 800 lb. rolls into a boxcar manually. It took 8 men with hand trucks 3½ hours to do the job. Now an E-P truck operator with one helper loads the car in 40 minutes.

60% SAVING IN MAN-HOURS
This firm has a job of unloading 2000 cases of food from a boxcar and moving them to storage in a warehouse. Previously it took 8 men with hand trucks 20 man-hours. Now an E-P truck and 2 men do the job in 8 man-hours. *Saving is 12 man-hours or 60%.*

THESE MEN are making a "Roof Survey Report." Ask about this free service . . .

The Built-Up Roof Survey tells exactly what condition your roof is in, gives you a permanent record, helps you plan ahead for roofing maintenance. Yours for the asking!

TAKE ADVANTAGE of this *free* Johns-Manville service to find out the exact condition of your built-up roof. It will enable you to make plans *now* for repairs and maintenance in the future.

That's what plant engineers and maintenance executives *like* about the J-M Roof Survey Plan.

Don't take *your* roof for granted, even though it doesn't *seem* to be leaking. Many a roof with torn flashings, dried-out felts, even rotted decks has been *assumed* to be in "good condition." The Roof Survey Report will cover all the critical areas . . . flashings, deck, roofing felts, parapet walls, skylights, etc. It will be an accurate picture by a roofing *expert*—the J-M Approved Built-Up Roofing Contractor. And it will cost you only the trouble of *asking* for it.

Let us send you the interesting booklet, "Things You Should Know About Your Roof." It gives complete information about the *free* J-M Roof Survey Plan, together with the full story of the J-M Flexstone* Asbestos Roof and the Asbestile* Flashing System. Write Johns-Manville, Box 158, New York 16, N. Y.

JOHNS-MANVILLE JM PRODUCTS

Mail your Request today

Johns-Manville
Box 158, New York 16, N. Y.

Please have one of your Approved Built-Up Roofing Contractors see us about making a free survey of our roof.

Name_____

Address_____

_____

*Reg. U. S. Pat. Off.

Made of ASBESTOS

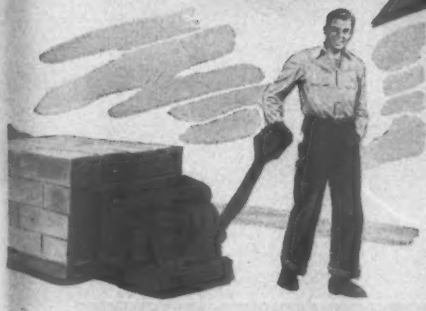
Johns-Manville FLEXSTONE Built-Up Roofs

ASBESTOS CORRUGATED TRANSITE* • ACOUSTICAL CEILINGS

DECORATIVE FLOORS • MOVABLE WALLS • ETC.

We're Really In Action Now...

With Industry's Favorite Time and Money Saver!



"Yep . . . we're really in action now since the Boss found a way to eliminate material handling bottlenecks. I can actually handle tons and tons of materials every day—more *by myself* than three workers could by manual handling methods! We speeded-up production . . . ship more goods faster . . . and I heard the Boss say that with these hard-working Automatic "101" Transporters we're helping to reduce the unit cost of our product."

What Is the Cost of Handling Your Material Manually?

Automatic "101" Transporters have a well earned reputation for keeping production rolling. They can save as much as 50% or more of your material handling costs—actually add man-hours to your plant's productive capacity without increasing workload of your personnel.

Figure your present material handling costs. Then match these figures against what the "101" Transporter will do for you.

And, when you consider Automatic's engineering know-how you will realize why the "101" TRANSPORTER operator-led electric trucks pay off with STAYING POWER. To clearly show how ruggedly these electric trucks stand up—to our knowledge every Transporter manufactured is still in service . . . and tens of thousands have been built.

They're sturdy! They are precision-built to give years of low cost, dependable service . . . and the thousands of Transporters built and subjected to the toughest kind of service since 1942—*prove that they do!*

Fingertip Control Handles Tons of any Product

A touch of the magic button raises tons of material to moving height in seconds. Forward and reverse control buttons are two-speed . . . controls operate from any position, including vertical. Improved handle design gives extra operator protection . . . makes control surer, easier. Release of handle applies positive mechanical safety brake.

"101" Transporter
A PRODUCT OF AUTOMATIC
Lightens LIFE'S LOADS

JUST OFF THE PRESS! NEW! FREE MATERIAL HANDLING ANALYSIS GUIDE

NOW! PROVE TO YOURSELF the need for efficient materials handling *in your plant.* Mail coupon for this BRAND NEW *Material Handling Analysis Guide.*

Trade **Automatic** Mark

39 West 87th Street, Dept. W-1, Chicago 20, Illinois

Without obligation, please send me, your NEW "Material Handling Analysis Guide," to help *me* study material handling problems in my own plant.

Company Name.....

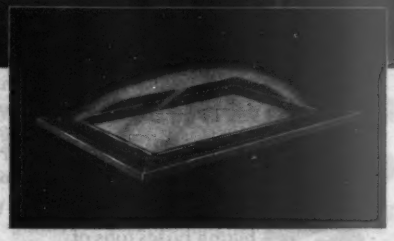
By.....*Title*.....

Street Address.....

City.....*Zone*.....*State*.....

WORLD'S LARGEST EXCLUSIVE BUILDER OF ELECTRIC INDUSTRIAL TRUCKS

NOW! *turn off the lights... turn on the daylight!*



"Elimination of electric lighting during daylight hours, better distribution of light to create better working conditions . . . consequently safer conditions and better inspection of the merchandise" are the reasons of the Lindblad Construction Company for recommending Wascolite Skydomes in the new addition to the General Refractories Co. plant, Rockdale, Ill. Note sharp contrast between daylighting by Skydomes and illumination by incandescent lamps in adjoining structure (circled).

You can save thousands of dollars annually in power costs alone with Wascolite Skydomes . . . world's most efficient daylighting units. Improved production, safer working conditions, and elimination of lighting maintenance for daytime operations are also achieved.

Skydomes transmit 62% more light than conventional skylights* . . . are weather-proof and shatter-resistant. They come completely prefabricated . . . are installed in *minutes*. They are 100% *worry-proof* . . . require no maintenance except for routine washing under extreme conditions. Skydomes are adaptable for any climate because their design permits free expansion and contraction of the Plexiglas dome.

Wascolite Skydomes are available in stock sizes to fit standard roof openings (custom sizes to order) . . . in square, circular and rectangular frames . . . in *clear colorless* or *white translucent* Plexiglas. Specified light readings are easily obtained. Write for complete information.

***By independent laboratory tests; name on request**

WASCOLITE SKYDOMES®

PATENT PENDING

"62% More Light On The Subject"

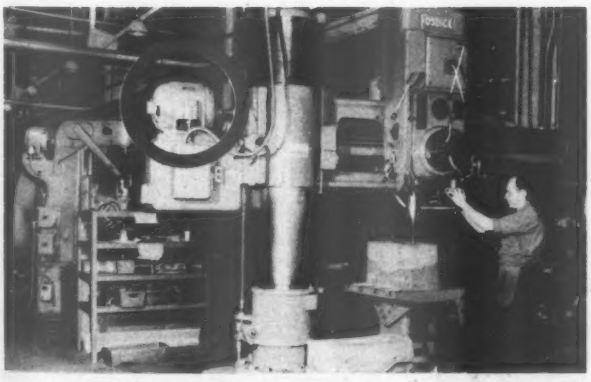
WASCO FLASHING CO., 81 FAWCETT ST., CAMBRIDGE, MASS.

"We have three shifts in operation," says Julius J. Domonkos, Vice-President in Charge of Manufacturing, Bell Aircraft Corporation. "That's full production on a 24-hour day basis. For the past 10 years we've been depending on Tri-Clad motors to carry the load. We've never regretted putting our confidence in this fine motor!"

G-E Tri-Clad Motors drive the machines that are instrumental in producing helicopters, guided missiles, rocket motors, research aircraft, and jet aircraft engine nacelles for our rapidly expanding armed forces. At Bell Aircraft Corporation, G-E Tri-Clads are known as a thoroughly dependable motor —tough on the outside . . . on the inside . . . at the bearings.

BELL AIRCRAFT CORPORATION:

"We've been depending on Tri-Clad* Motors for Ten Years . . ."



This Tri-Clad driven radial drill takes care of most of the large dies for the entire Bell plant. Big dies and bolster plates are drilled and tapped on this machine, a critical part of the Bell operation. Despite continuous use, plant personnel can't remember a single interruption due to Tri-Clad failure!

*Reg. trademark of General Electric Co.

FASTEST BOMBER IN THE WORLD! Jet engine nacelles for the 600-plus miles-per-hour B-47 are being produced at a record-breaking clip in the Bell plant at Buffalo, N. Y. The "Stratojets" represent a major advance in bombardment aircraft.

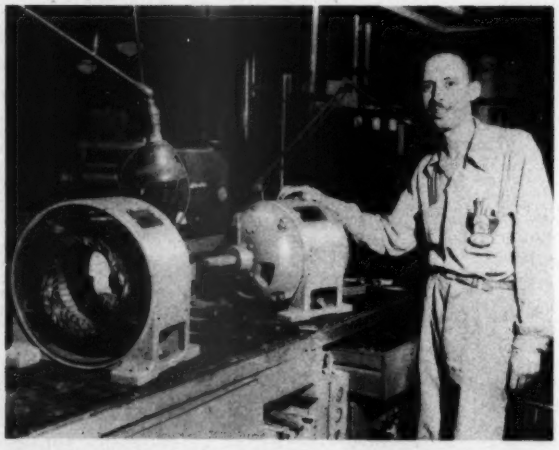
GENERAL ELECTRIC

TRI-CLAD MOTORS

REG. U.S. PAT. OFF.

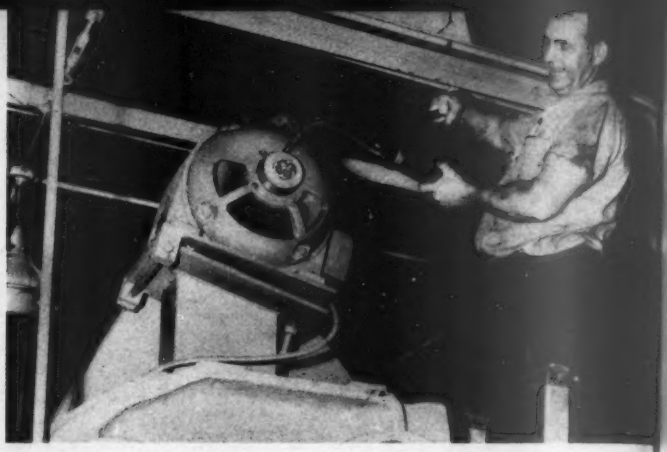
Help keep Bell Aircraft production up!

Marvin Limburg (left), Foreman of Bell's Tool and Die Shop, comments, "I don't believe we've ever lost machine time due to breakdown of Tri-Clad motors. And our jig-borers, for example *have been operating around the clock for the last 8 to 10 years!*"

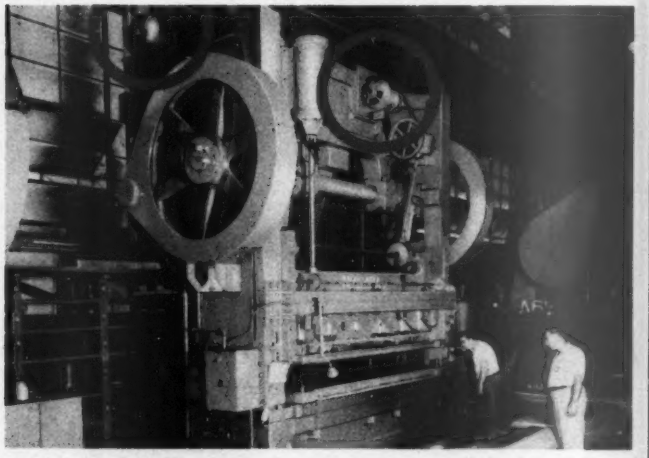


"It's the easiest motor we have to maintain" according to Maxwell Anderson, Crew Chief of Bell's motor repairmen. "There's more working room inside and more room in the slots. It's become a byword with us that if you give a Tri-Clad motor ordinary care you'll never have to worry about maintenance."

TIMELY READING—With every electric motor needed on the line, you'll want a copy of the G-E manual on "How to Maintain Motors and Generators." It's free; just ask for bulletin GET-1202. *Sect. 752-10, General Electric Company, Schenectady 5, N. Y.*



Greasing isn't necessary on a Tri-Clad motor in normal service, but it's always reassuring to know that you *can* lubricate if you so desire, without time-consuming disassembly. The photo shows how easy it is: remove relief plug, attach the grease gun nozzle, squirt—the job is finished.

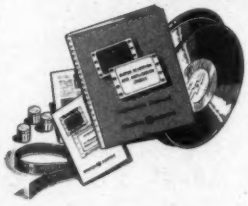


This huge punch press is an important tool maker. Anton Geiser (right), assistant punch press foreman, says: "I can't recall a single shutdown of this section due to motor failure." Almost all motors in this department are Tri-Clad. This is another Bell Department which has been operating around the clock; cannot afford to lose time because of motor breakdown.

NEW! A Helpful Training Course on Motors!

Everyone concerned with technical training problems will want this new G-E Motor Selection and Application Course. Consists of 9 short, easily understood lessons. Complete kit —slide films, review booklets and instructor's manual— $100.00. Call or write your nearest G-E sales office.

Look at the Scope of this Course



1. Fundamentals of Motors
2. Types of Motors
3. Fundamentals of Selection
4. A-C Induction Motors
5. Single-phase Motors
6. D-C Motors
7. Synchronous Motors
8. Adjustable-speed Drives
9. Gear Motors

GENERAL ELECTRIC

piping repairs cost more now!

Crane No. 351 125-Pound Iron Body Globe Valve

You make fewer of them by using Dependable Quality

CRANE VALVES

...That's why more Crane Valves are used than any other make

Preferred for true, tight seating

For smooth, positive regulation of flow, check Crane quality engineered Iron Body Globes with composition or metal disc. They're easy to operate; easy to maintain. Guide stem under disc assures square seating... true disc travel with minimum vibration. Seat rings are screwed in and can be renewed if necessary.

These rugged valves require little maintenance. Roomy stuffing box with bolted two-piece gland keeps tight stem seal, lengthens packing life. Stem threads are outside valve body, easy to lubricate.

Ask your Crane Representative to show you how Crane Quality valves and fittings not only give you more dependable piping performance... but cost less in the long run.

CRANE CO.

General Offices:
836 S. Michigan Ave., Chicago 5, Ill.
Branches and Wholesalers Serving All Industrial Areas

VALVES • FITTINGS • PIPE • PLUMBING • HEATING

Stone or Steel

Gulf Periodic Consultation Service contributes to better equipment performance and lower maintenance costs in scores of quarries.

Operating at capacity, leading steel mills rely on Gulf Periodic Consultation Service to help keep equipment going "around the clock."

. . . industry cuts costs through

GULF PERIODIC CONSULTATION SERVICE

Gulf sales and staff engineers are welcome visitors as they make periodic service calls to mines, quarries, fleets, railroads, power and industrial plants that use Gulf quality oils and greases.

For through Gulf Periodic Consultation Service they provide effective help on problems involving lubricants, fuels, rust preventives, solvents, waxes, cutting and special process oils. Their recommendations and suggestions nearly always result in lower-cost operation—and that's exactly what they have constantly in mind!

The knowledge and experience of these trained specialists can be applied profitably to your plant or operation. Write today for a copy of the booklet which explains Gulf Periodic Consultation Service and tells what it will do for you. Gulf Oil Corporation · Gulf Refining Company, 719 Gulf Building, Pittsburgh 30, Pa.

FIFTY YEARS OF SERVICE
1901 GULF 1951
PETROLEUM AND ITS PRODUCTS

See for yourself how you can get a better looking, longer lasting paint job for less money with famous Barreled Sunlight.

The "On-the-Wall" Test is "On the Level" in figuring painting costs

There are no "and's, if's, or but's" about figuring painting costs when you go by the "on-the-wall" test. You know what you're getting for your money . . . you know *in advance* what you can save in paint and in labor.

Here's the way you do it:

Take a gallon of Barreled Sunlight and a gallon of any other good paint . . . thin each according to directions . . . and see how much more paint, *ready for the brush*, Barreled Sunlight gives you. Next, let your maintenance painter apply all of each paint on separate wall areas and see how many more square feet of better looking, *better hiding* coverage you get with Barreled Sunlight. And . . . since labor represents 80% of the total cost of a painting job . . . notice how much faster and easier your painter can apply Barreled Sunlight.

This "on-the-wall" test is a simple, easy, inexpensive test to make . . . and on a large industrial or commercial job it can lead to savings of hundreds of dollars. Write and our representative will be glad to demonstrate exactly what we mean.

BARRELED SUNLIGHT PAINT COMPANY, 2-K Dudley St., Providence, R. I.

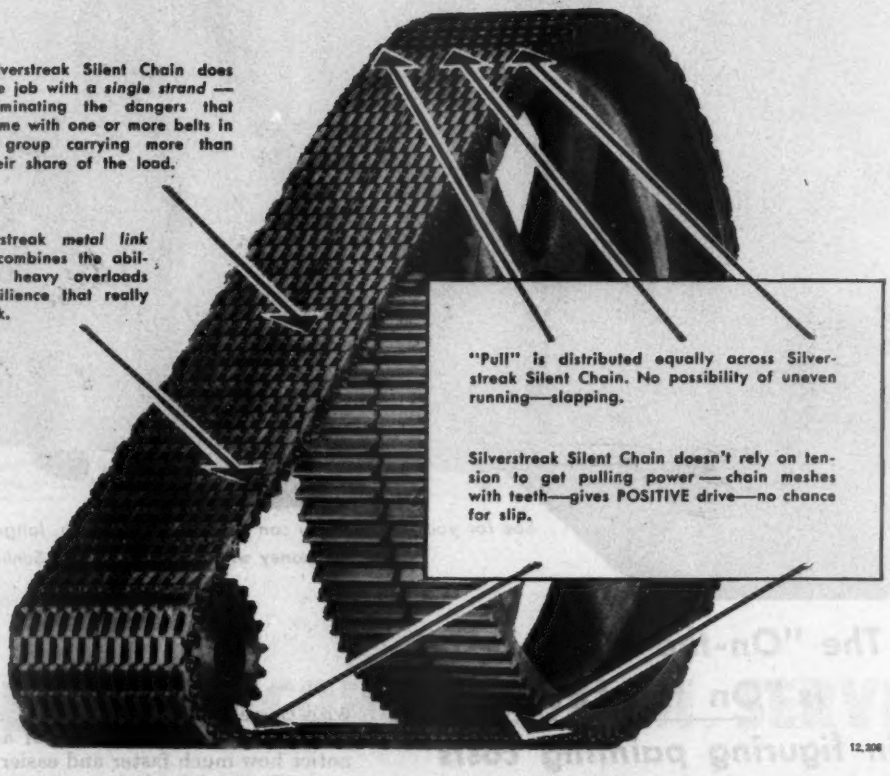
Barreled Sunlight *Paints*

In whitest white or clean, clear, wanted colors, there's a Barreled Sunlight Paint for every job

IT ALWAYS COSTS MORE NOT TO PAINT!

SEE US AT THE PLANT MAINTENANCE SHOW, PHILADELPHIA, JANUARY 14-17, BOOTH 211.

SLIP-PROOF
SLAP-PROOF
SHOCK-PROOF


Silverstreak Silent Chain does the job with a *single strand* — eliminating the dangers that come with one or more belts in a group carrying more than their share of the load.
Husky Silverstreak *metal link* construction combines the ability to carry heavy overloads with the resilience that really absorbs shock.
"Pull" is distributed equally across Silverstreak Silent Chain. No possibility of uneven running—slapping.
Silverstreak Silent Chain doesn't rely on tension to get pulling power — chain meshes with teeth—gives POSITIVE drive—no chance for slip.
12,306

Get Full RPM Transmission With LINK-BELT Silverstreak Silent Chain Drives

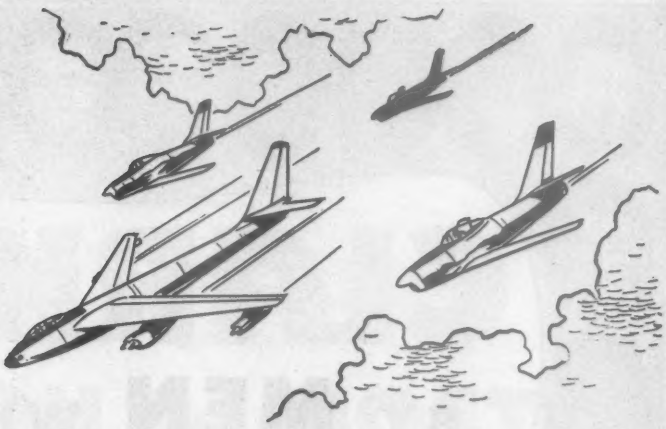
Yes, get the amazing, trouble-free efficiency of 98.2%. A standard of operation that continues throughout the long, long life of the drive. More than this — every rating and design is backed by a record of *proven performance*. And every chain is engineered for the job. You conserve space, too — for Link-Belt Silverstreak Silent Chain Drives operate efficiently on short centers. Ratios as high as 10 to 1 are commonly used.

Little wonder, then, that so many concerns to whom top operation efficiency and rugged dependability are a must, standardize with Link-Belt Silverstreak Silent Chain Drives.

LINK-BELT COMPANY, Chicago 9, Indianapolis 6, Philadelphia 40, Atlanta, Houston 1, Minneapolis 5, San Francisco 24, Los Angeles 33, Seattle 4, Toronto 8, Springs (South Africa). Offices in principal cities.

LINK-BELT

SILVERSTREAK SILENT CHAIN DRIVES



THIS IS AMERICAN

PHILLIPS HEADquarters for the Aviation Industry

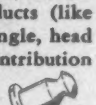
HERE'S YOUR TOP SOURCE FOR PRECISION FASTENINGS...

AMERICAN PHILLIPS SCREWS AND BOLTS

For high-speed, high-altitude aircraft, American produces close-tolerance screws and bolts of alloy steels, and A. N. fasteners of carbon steel, stainless steel, and selected brass and aluminum . . . to Air Force-Navy aeronautical standards.

The American Phillips Recess affords exceptional torquing strength, a feature which . . . added to precision manufacture and quality control . . . gives to all American products (like the screw shown above) accuracy of countersink angle, head thickness, and concentricity. This is American's contribution to uniform flushness in assembly.

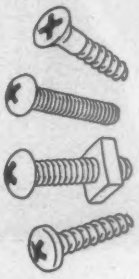
. . . and "HI-SHEAR"* RIVET PINS



These rugged fasteners are made by American in alloy steels, to closest tolerances and highest standards of physical quality.

So on *any* of your fastening problems, it pays to "*ask American first,*" for then you get the know-how of American engineers and research experts . . . plus the modern facilities of one of the industry's high-volume production plants.

*Trademark Reg. U. S. Pat. Off.



AMERICAN SCREW COMPANY

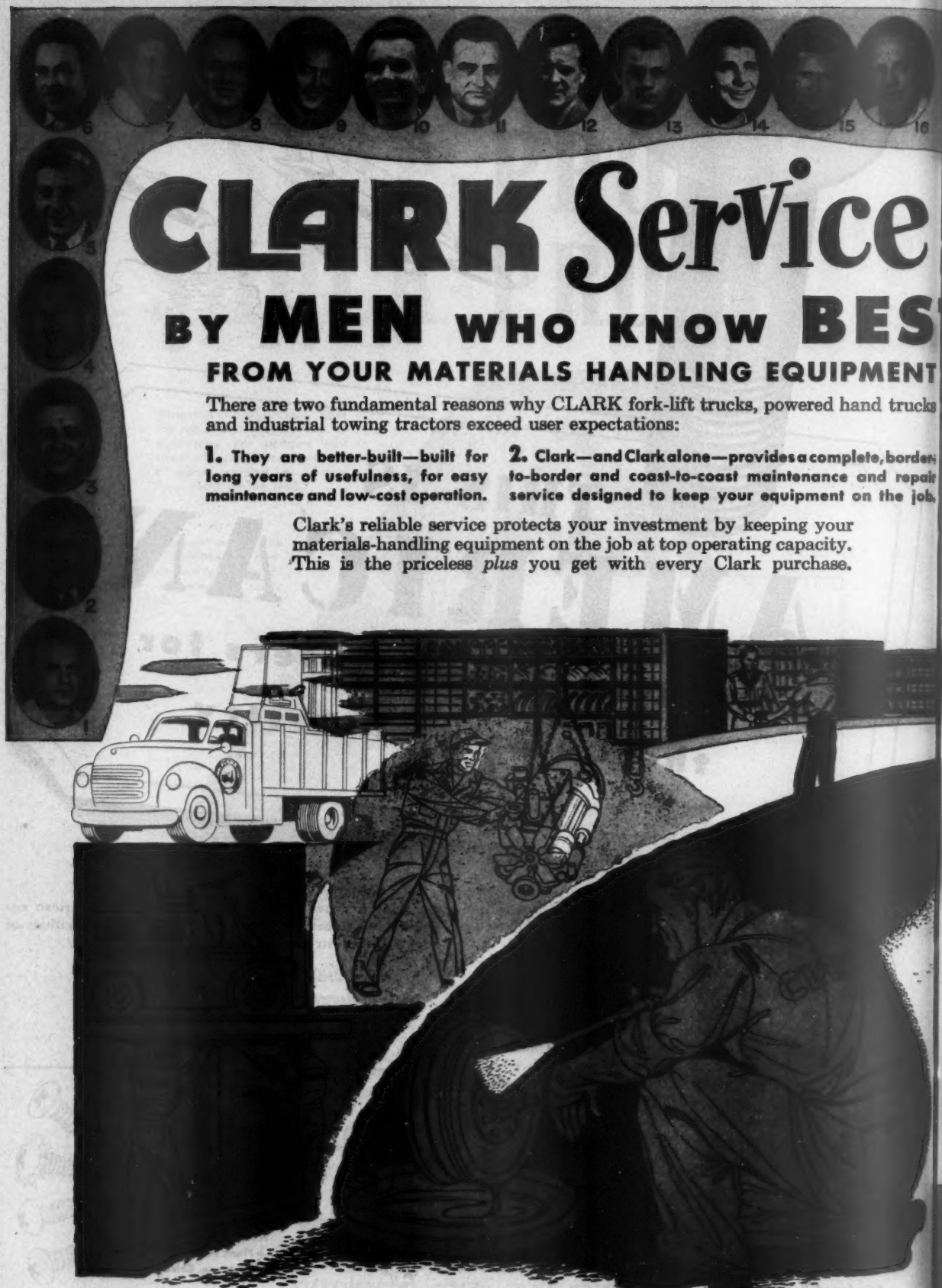
PHILLIPS HEADquarters

WILLIMANTIC, CONNECTICUT

Main Office & Plant
Willimantic, Conn.

Office & Plant, Norristown, Pa.

Office & Warehouse, Chicago, Ill.



CLARK Service

BY MEN WHO KNOW BEST

FROM YOUR MATERIALS HANDLING EQUIPMENT

There are two fundamental reasons why CLARK fork-lift trucks, powered hand trucks and industrial towing tractors exceed user expectations:

1. They are better-built—built for long years of usefulness, for easy maintenance and low-cost operation.

2. Clark—and Clark alone—provides a complete, border-to-border and coast-to-coast maintenance and repair service designed to keep your equipment on the job.

Clark's reliable service protects your investment by keeping your materials-handling equipment on the job at top operating capacity. This is the priceless *plus* you get with every Clark purchase.

...coast-to-coast

HOW TO GIVE YOU THE MOST

What You Need When You Need It!

You have no time for fooling around—no stomach for "lip" service, nor "lick-and-promise" service in this day and age. Your machines must be kept rolling if you are to operate at a profit. Clark gives you "work-or-else" service—nothing less—by skilled and genuinely interested mechanics. You get what you need, when you need it.

Every service station stocks genuine Clark parts. And behind these stations is Clark factory service which fills 98% of emergency orders in less than 48 hours! We know of no other materials-handling service that can approach this record—this program.

Clark fork-lift trucks, powered hand trucks and industrial towing tractors solve your materials-handling problems. And Clark's unrivalled service keeps 'em rolling. Clark machines and Clark service are an unbeatable team that plays only for *your* profit:

THESE MEN HEAD UP CLARK'S INCOMPARABLE SERVICE

1—JESS PULVER
ALBANY, NEW YORK
*Industrial Truck Sales, Inc.

2—CHARLES P. KOERBER
BALTIMORE 2, MARYLAND
*Failsway Spring & Equipment Co.

3—ED RONNING
BIRMINGHAM, ALABAMA
*M-H Equipment Company

4—WOODROW L. KURTZ
BOSTON, MASSACHUSETTS
*Brodie Industrial Trucks, Inc.

5—JOHN VACANTI
BUFFALO, NEW YORK
*Brodie Industrial Trucks, Inc.

6—ROBERT G. GOERS
CHICAGO 21, ILLINOIS
Lift Truck Service Company

7—CHARLES MUMMERT
CINCINNATI 9, OHIO
*Robert C. Young & Company

8—JOE CAMERIERI
CLEVELAND 11, OHIO
*Material Handling Equipment Corp.

9—FRED ROSEBOOM
COLUMBUS, OHIO
*Edward J. Sherry Co.

10—JIMMY CLARKSON
COLUMBIA, SOUTH CAROLINA
*M-H Equipment Company

11—THOMAS RICHARDSON
DALLAS, TEXAS
Industrial Truck Service Co.

12—LYLE SCHMIDT
DAVENPORT, IOWA
The All-Wheel Drive Company

13—P. N. MAHR
DENVER 4, COLORADO
Fork Lift Truck Service Company

14—CHARLES D. REES
DETROIT 13, MICHIGAN
Industrial Truck Service, Inc.

15—MARTIN PETERS
FARGO, NORTH DAKOTA
*Sweeney Brothers Tractor Co.

16—HAROLD HOAG
FRESNO, CALIFORNIA
*Robert H. Braun Company

17—RALPH B. (Red) TAYLOR
GRAND RAPIDS, MICHIGAN
Industrial Truck Service, Inc.

18—A. H. VANHOY
GREENSBORO, NORTH CAROLINA
*Industrial Truck Sales & Service Co.

19—JOE CITAK
HARRISBURG, PENNSYLVANIA
*Brodie Industrial Trucks, Inc.

20—GEORGE OGATA
HONOLULU, T. H.
*Pressed Steel Car Company

21—HARRY DARE
HOUSTON 2, TEXAS
Industrial Truck Service Co.

22—PAUL G. PILKINTON
INDIANAPOLIS 5, INDIANA
*W. A. Marschke & Sons, Inc.

23—E. T. MARKS
JACKSONVILLE, FLORIDA
Forsyth Garage

24—IRL T. OLIVER
KANSAS CITY 8, MISSOURI
*Lift Truck Sales & Service, Inc.

25—FAYE HIGGINS
LOS ANGELES 22, CALIFORNIA
*Robert H. Braun Company

26—C. L. WALDEN
MIAMI, FLORIDA
Walden's Garage

27—R. G. BUCHIGNANI
MEMPHIS 3, TENNESSEE
*Fred J. Vandemark Company

28—WALTER REPINSKI
MILWAUKEE 10, WISCONSIN
*Wisconsin Industrial Truck Co., Inc.

29—EDWARD F. BALL
MINNEAPOLIS 7, MINNESOTA
*Material Handling Engineers, Inc.

30—HENRY BOUDRIAS
MONTREAL 9, QUEBEC
*J. H. Ryder Machinery Co., Reg.

31—JOHN D. LANKTON
NEW HAVEN 15, CONNECTICUT
*C. E. Reutter Corporation

32—A. (ARCHIE) McGUFF
NEW YORK 14, NEW YORK
*Bond Industrial Maintenance Co., Inc.

33—R. F. (CHICK) CHIKAR
NORFOLK, VIRGINIA
*McLean Equipment, Inc.

34—H. V. CONNEY
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CLARK ELECTRIC AND GAS POWERED FORK TRUCKS
AND POWERED HAND TRUCKS • INDUSTRIAL TOWING TRACTORS

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Please send me the new "Time and Place Utility" issue of Material Handling News.

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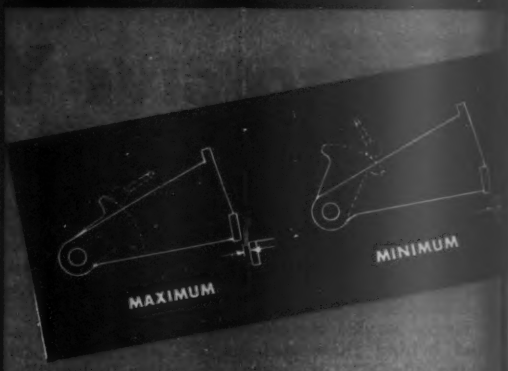
AUTHORIZED CLARK INDUSTRIAL TRUCK PARTS AND SERVICE STATIONS IN STRATEGIC LOCATIONS

MICRO-SET K

acclaimed by



KNIVES REMAIN SHARPER LONGER BECAUSE OF MICRO-SET

From coast to coast Steelweld Shear users are acclaiming Steelweld's MICRO-SET knife adjustment. There's nothing like it available on any other shear—at any price. It's the greatest development in shear design made in decades.

As every shear user knows, there is a direct relation between the thickness of plate cut and the clearance between knives for most satisfactory results. But heretofore, because of tedious time-consuming work required to change knife clearance, most shear operators seldom adjusted the clearance unless there was a great variation in the thickness of plates being cut. Despite the advantages resulting, they could not afford the time required to adjust the knives to proper clearan

Steelweld's MICRO-SET makes knife adjustment f and easy. Merely turn a crank and watch a dial. Th all there is to it. In a jiffy the indicator is on the pro figure and the machine is ready to go. No bolts loosen! No bed to move! No feeler gauges required! large easily-read dial indicates the clearance betwe knives in thousandths of an inch and also shows plate thickness that may be cut with any knife setti

Because of simple MICRO-SET knife adjustment, ev cut made on Steelweld Shears is the best possible c straight, smooth, accurate. And of importance, KNI REMAIN SHARPER, LONGER.

A FEW OF MANY OTHER *Production Speeding* FEATURE

LIFT-UP BACK GAUGE

Lift-up back gauge can be raised out of way to allow long sheets to pass through by easy movement of horizontal bar. No time need be spent detaching or removing back gauge. Standard feature on ¼ inch capacity shears and larger.

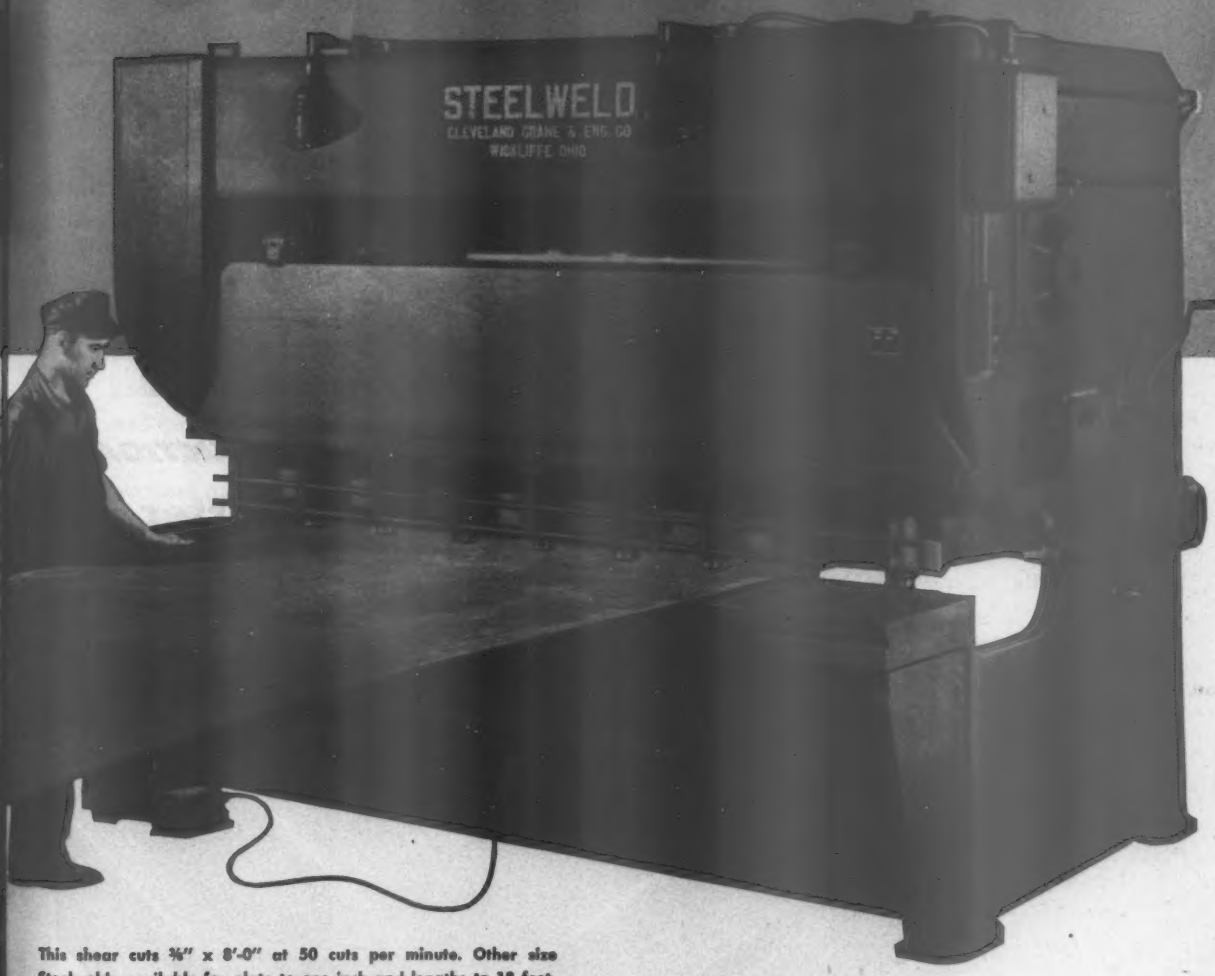
FATIGUE-REDUCING FOOT CONTROL

Convenient electric foot-switch operation is standard for all Steelweld Pivoted-Blade Shears. The switch can be moved around floor to wherever handiest. Eliminates tiresome leg lifting ordinarily required.

STEP-SAVING GAUGE ADJUSTMENT

Steelweld design eliminates need of ma around machine to adjust hand-operate gauge at rear. Adjustment crank is reached at right end near front. When power-driven gauges can be furnished.

KNIFE ADJUSTMENT
d by STEELWELD SHEAR USERS



This shear cuts ⅜" x 8'-0" at 50 cuts per minute. Other size Steelwelds available for plate to one inch and lengths to 18 feet.

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CATALOG No. 2011 gives construction and engineering details. Profusely illustrated.

THE CLEVELAND CRANE & ENGINEERING CO.
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STEELWELD PIVOTED BLADE SHEARS

WESTINGHOUSE
DO NOT LUBRICATE
Life-Line motor
PAIRED FOR PRODUCTION
Life-Linestarter

Cut motor failures with these two

Don't take our word for it. Here's what users of Life-Lines say: "We always have had bearing failures on our pump motors. It was quite an expense in repair costs and down time. Since we installed Life-Line motors, we have had no down time . . . no failures. We now standardize on Life-Lines."

Another user reports: "Our former starters employed solder pot mechanisms. Much trouble was experienced. Since we've switched to Life-Linestarters,® our troubles are gone. The operation of the bimetallic disc is positive."

These reports are two of several hundred such reports resulting from the new kind of dependability built into the Life-Line motor and Life-Linestarter.

Life-Line Motors

Steel frame . . . adds strength, cuts weight.
Pre-lubricated bearings . . . no greasing.
Improved windings . . . lengthen electrical life.

Life-Linestarter

Bimetallic disc . . . calibration unaffected by aging or oxidation.
Servicing is simple . . . all parts front removable.
Screw driver only tool required.

Get the advantages of these two—your best bet to cut motor failures. Ask your Westinghouse representative for copies of "Life-Line Motor Book", B-3842 and "Tomorrow's Starter Today", B-4677, or write Westinghouse Electric Corporation, P.O. Box 868, Pittsburgh 30, Pa.

J-21644

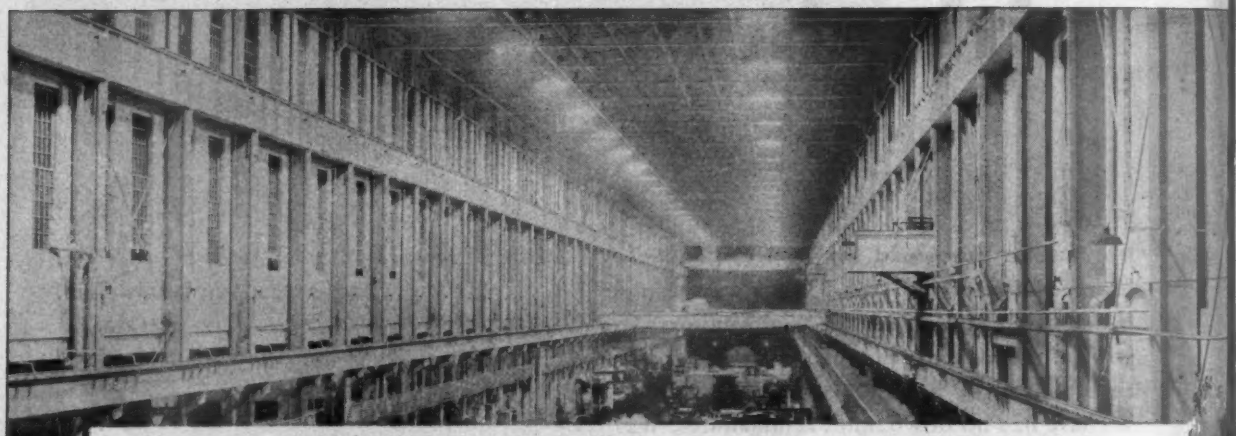
YOU CAN BE SURE . . IF IT'S Westinghouse

Life-Line

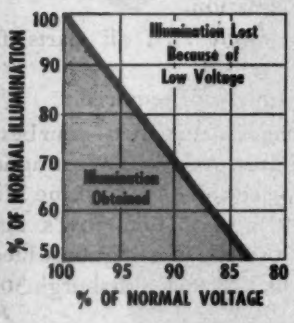
MOTORS and CONTROLS

Allis-Chalmers

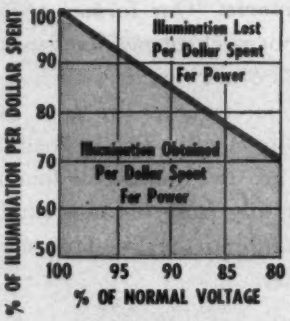
STOP Wasted



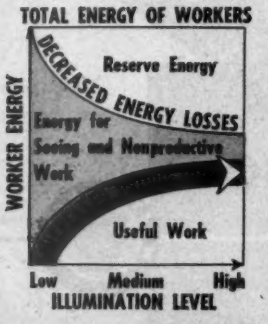
HOW UNDERVOLTAGE WASTES MAN-HOURS . . . CUTS PRODUCTION



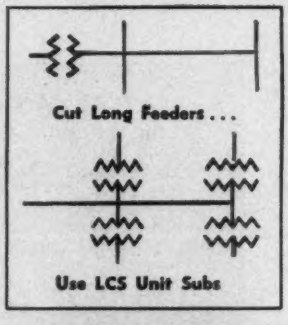
GOOD ILLUMINATION demands that rated voltage be maintained to all lighting fixtures. Illumination falls off rapidly on undervoltage . . . light output of filament bulbs is cut in half when voltage falls about 17%. Poor lighting causes eye strain . . . slows down workers . . . makes inspection difficult . . . causes increased scrap.



YOU PAY for illumination you don't get when you operate your distribution system at undervoltage. For example: at 10% undervoltage, illumination is cut 30% but power consumption is cut only 15%. Eliminate this power waste . . . get all the power you pay for by maintaining full voltage to all lighting fixtures.



MORE ENERGY AND TIME for useful work results from quicker seeing in well illuminated plants. In one case illumination was increased from 6 to 16 ft. candles (an increase from 83% to full voltage) . . . resulting in a 9% increase in production—20% decrease in accidents. Again, production increased 25% with an increase from 6.8 to 24.5 ft. candles.



A MAJOR CAUSE of undervoltage is the voltage drop in secondary feeders. Long lines of heavy copper carrying power at low voltage may prove inadequate as production schedules are stepped-up and new machines added. Install Allis-Chalmers LCS Substations at load centers to cut feeder length, reduce voltage drop and increase production.

Unit Substations

Manhours!

By Improving Illumination

BOTH MACHINERY AND PERSONNEL gain efficiency when you install unit substations to correct undervoltage. That's because no worker can do his best *unless* his job is well lighted . . . no electrical equipment gives top performance *unless* it operates at proper voltage.

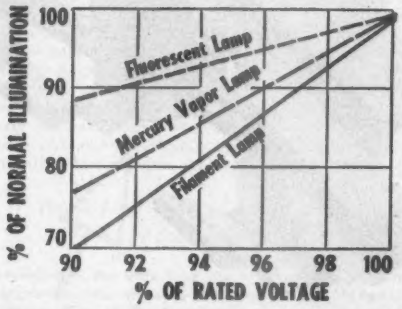
Filament bulbs, for instance, give 15% less than rated light when voltage falls only 5%. On undervoltage, fluorescent tubes and mercury lamps give less than rated light, are difficult to start, may flicker and go out. And when you operate at undervoltage, you are paying for power you're not using.

Eliminate power waste . . . manhour loss. Workers are more efficient, produce more work of better quality when illumination is adequate. Put *all* the power and manhours you're buying to work by maintaining proper voltage to all equipment. Install Allis-Chalmers LCS Unit Substations at load centers and eliminate long runs of expensive low voltage cable. Allis-Chalmers LCS Load Center Unit Substations are neat, compact, easy to install and provide protection to personnel.

You can count on the cooperation of experienced Allis-Chalmers substation engineers in working out your distribution problem. Get in touch with your A-C representative, or write Allis-Chalmers, Milwaukee 1, Wisconsin. Ask for bulletins 11B6285A, 11B6325B, and 11B6895.

A-3328

LCS
Unit Substations



Undervoltage reduces the light output of filament, fluorescent and mercury vapor lamps. Although light output is least affected on fluorescent lamps, undervoltage makes them flicker, hard to start. Mercury lamps go out altogether at 10% undervoltage . . . require up to 20 minutes to regain full light output.

ALLIS-CHALMERS

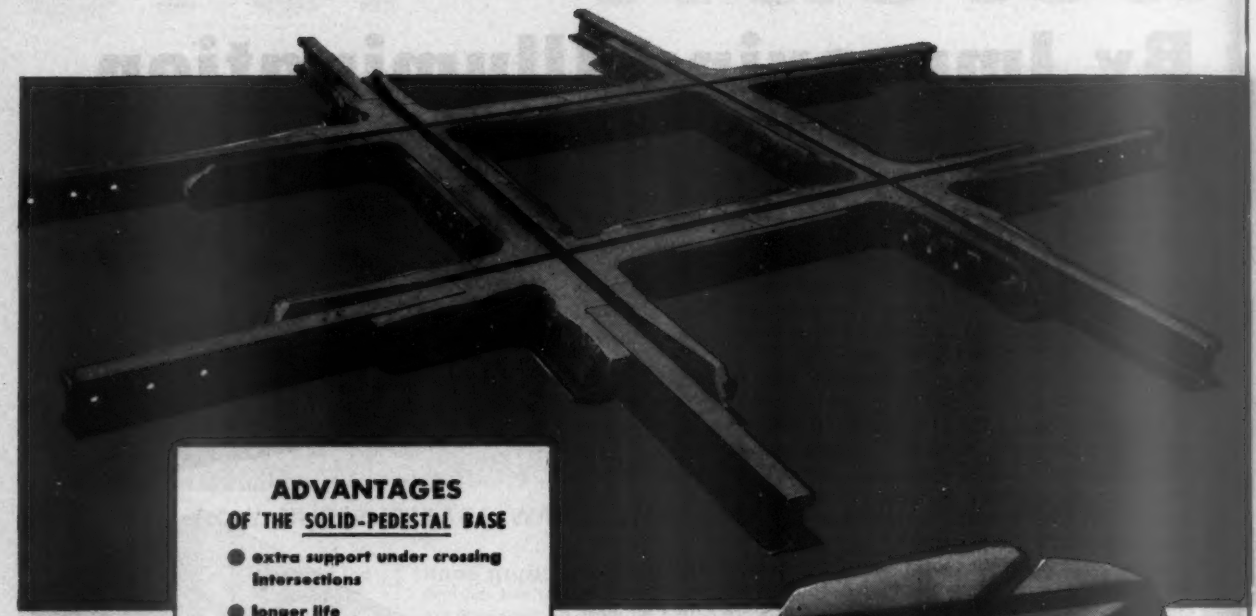
A-C ALLIS-CHALMERS

The most important crossing improvement in recent years...

Solid-pedestal base plus

U·S·S MANGANESE STEEL

more durable, lower in



ADVANTAGES
OF THE SOLID-PEDESTAL BASE

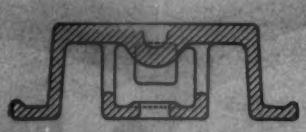
- extra support under crossing intersections
- longer life
- improved physical properties
- sounder metal

Compare these diagrams

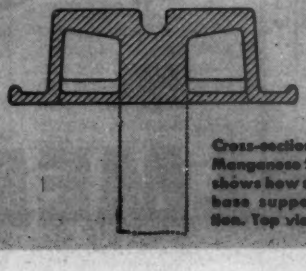
They show clearly why the U·S·S Manganese Steel Railroad Crossing is stronger and more durable.

Below the track intersection, where wheel impact is most severe, the ordinary crossing is hollow (below, left). In the U·S·S Crossing this part is of solid metal giving firm and additional support where it is needed most (center and right, below). It's easy to see why this construction lasts longer.

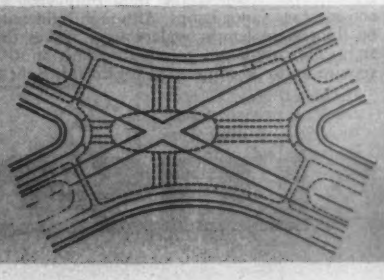
The dotted line in the center diagram indicates the approximate size of the reservoir necessary to handle the extra feed-metal used in casting a new U·S·S Manganese Steel Railroad Crossing. This reservoir (or riser), weighing from 200 to 350 lbs. is cut off and scrapped after the casting has solidified.



Cross-section of old-style manganese steel crossing. Note numerous ribs required to brace the intersection.



Cross-section of new U·S·S Manganese Steel Crossing shows how solid-pedestal base supports intersection. Top view at right.



depth-hardened corners make

RAILROAD CROSSINGS

maintenance, smoother riding

A solid pillar of tough manganese steel directly under all crossing intersections is the exclusive feature that distinguishes this newly developed crossing. Here, where maximum strength is required to resist the destructive pounding of today's faster, heavier trains, the U·S·S Manganese Steel Railroad Crossing is extra strong.

The solid-pedestal base, an integral part of the casting, substantially reduces deflections resulting from wheel batter, a major cause of internal cracks that ultimately lead to complete deterioration of crossings. This vertical pillar of solid metal, rigidly reinforced, is far stronger than any other type of intersection support used today.

Metallurgical advances have improved new U·S·S Manganese Steel Railroad Crossings in still another way. By using more feed-metal (5 to 10 times more than is used in ordinary crossings) and exercising closer control over feeding, liquid metal under greater pressure flows unrestricted at the proper time to the solidifying area, preventing the formation of many of the pores and cavities characteristic of manganese castings.

Thus, in addition to the extra vertical support provided by the solid-pedestal base, the entire casting is sounder, freer of internal flaws, and less susceptible to spalling, chipping or cracking.

Depth-hardened corners reduce maintenance costs, assure smooth riding right from the start

Depth-hardening is another valuable, money-saving feature of the U·S·S Manganese Steel Railroad Crossing.

The ordinary manganese steel crossing is produced to a surface hardness of approximately 200 Brinell. The wheel batter of the first long train is depended on to work-harden the surface to approximately 400 Brinell—the hardness required to stand up under modern rail traffic. Though crudely effective, this wheel pounding also batters down the intersection corners—makes it necessary to build them back to normal track level repeatedly by welding and grinding. This costs money.

In contrast, the improved U·S·S Railroad Crossing has raised pads cast integrally on the three critical crossing corners of each intersection. These are shop-hammered to develop the desired hardness, and then ground down to track level to assure smooth riding. This controlled pre-hammering insures the proper depth hardness *before* installation, eliminates almost entirely the damaging effect of subsequent wheel batter, and virtually eliminates maintenance costs.

Here's why pre-hammered, depth-hardening reduces crossing maintenance

Wheel pounding is the only way the ordinary manganese steel crossing gets sufficient hardness. (Fig. 1) The first long train that batters across the intersection crudely work-hardens the steel to approximately 400 Brinell. But it also batters down the corners about ¼". It takes expensive welding and grinding to rebuild the corners back up to track level.

We avoid this trouble by casting the U·S·S Manganese Steel Crossing with 3/16"-high pads on the three critical corners (see Figs. 2 and 3). These pads are carefully shop-hammered close to track level to develop approximately 400 Brinell hardness, and are then ground to true level *prior* to installation. It saves time and money, gives you a smooth-riding crossing without rebuilding.

ADVANTAGES OF THE DEPTH-HARDENED CORNERS

- pounding-down of corners virtually eliminated
- maintenance costs greatly reduced
- much longer life due to higher impact resistance
- smooth riding without rebuilding

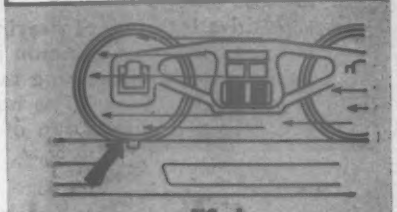


FIG. 1

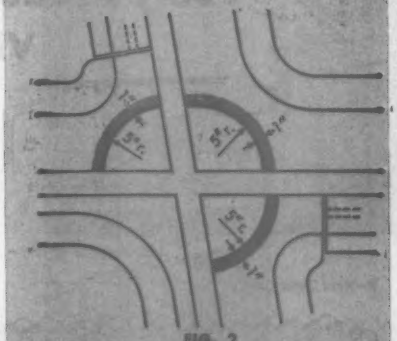


FIG. 2

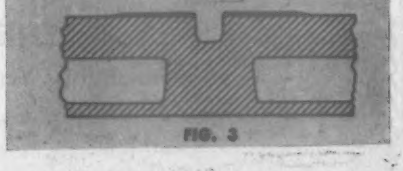


FIG. 3

For the complete story on this crossing, send for descriptive literature. Coupon is attached for your convenience.

United States Steel Company
Room 4309, 525 William Penn Place
Pittsburgh 30, Pa.

Please send me a copy of bulletin "Improved U·S·S Manganese Steel Railroad Crossings."

Name.....

Company.....

Address.....

City.....Zone.....State.....

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UNITED STATES STEEL

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Positive leashing of straying parts is one of the most common jobs for Bead Chain. And, nothing can equal it as a parts retainer! The non-kinking, free-swiveling action of a Bead Chain retainer assures full freedom in using the part or tool it secures. It is small, light, attractive . . . yet strong enough to hold under abusive strains.

Check your product now. Leash any part that may stray. It costs only a penny or two, as a rule, to add a Bead Chain retainer that's worth dollars as a trouble-saver for your customers. Check your plant, too, for opportunities to tie straying items like tools to the point of use and eliminate work delays.

Any Product Wins Buyer Approval When Vital Parts are Secured

Truly THE CHAIN OF A THOUSAND USES

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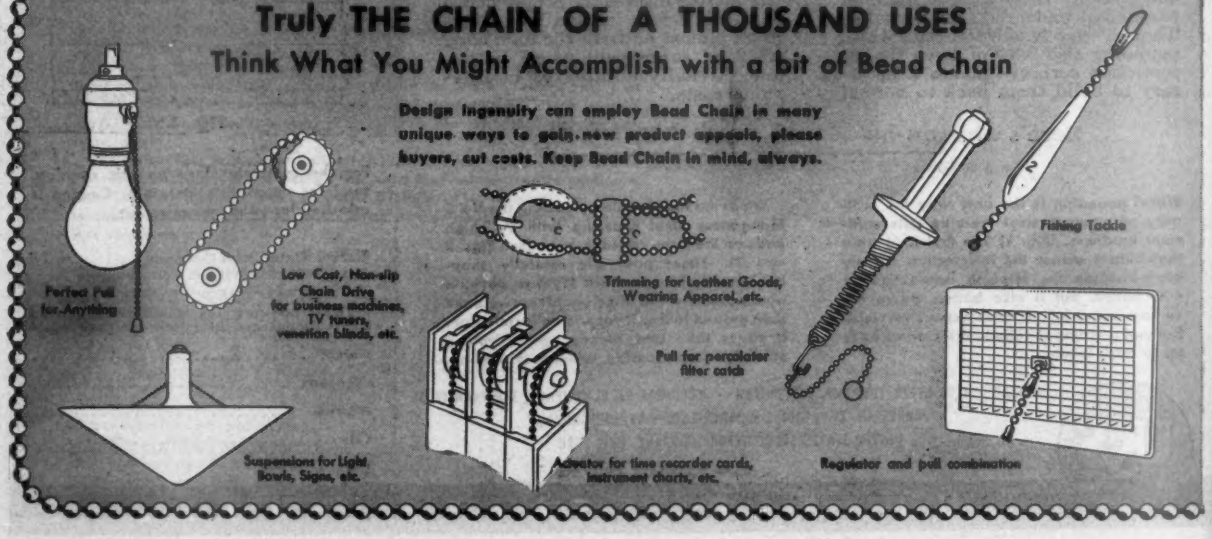
Design ingenuity can employ Bead Chain in many unique ways to gain new product appeals, please buyers, cut costs. Keep Bead Chain in mind, always.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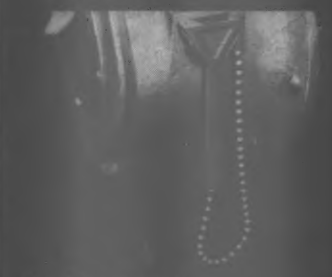

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Sterilizer Lamp Cap

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Get Our quote ... see for yourself ... if you use solid or tubular pin-like parts and variations of bushings, sizes up to ¼" dia. and to 1¼" length. With our unique MULTI-SWAGE METHOD, developed to produce Bead Chain, we make a big saving by greatly increasing production rate and eliminating scrap. For facts, write a note on coupon—"Send MULTI-SWAGE Catalog, too."

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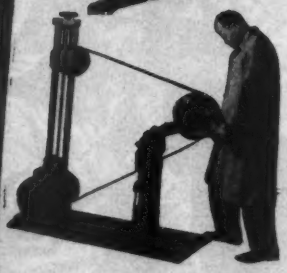
new

The BADER BELT POLISHER



Manufactured and Sold by
STEPHEN BADER & CO.
Rockville Centre, New York

This versatile machine enables use of a wide range of diameters in contact wheels — from 2" to 18" — permitting the finishing of convex or concave surfaces. The contact wheel is an idler, and as the drive wheel *pulls* the belt past the work, no chatter occurs in even heavy cuts. Wheels as well as belts can be changed in only seconds. Wheels may be of any material giving the desired flexibility and contour — cloth, soft rubber, felt, etc.

Your BEHR-MANNING Abrasives Engineer will give you full details.

This in
your
idler

BEHR-MANNING

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COATED ABRASIVES · SHARPENING

NORTON abrasives

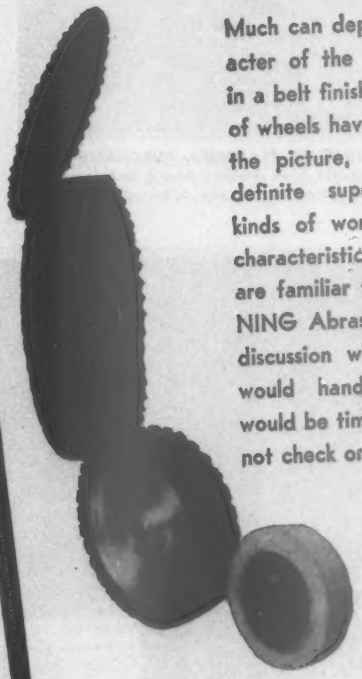
EXPORT: BEHR-MANNING OVERSEAS INC., NEW ROCHELLE, N.Y., U.S.A.

st in BELT POLISHING!

New BELT STRAPPING UNIT

This inexpensive arrangement which can be built in your plant requires a flanged motor pulley, and an idler of the spring tension type, with a foot treadle to relieve belt tension and permit the operator to remove the belt from the idler pulley. Thread the belt through the hole to be polished, and replace the belt on the idler. Release the foot treadle. It is not necessary to stop the driving wheel as the belt slips on the flanged pulley when tension is eased. Here is certainly a fast way to finish those hard-to-get-at inside surfaces such as the eyes of shears. The BEHR-MANNING Abrasives Engineer has all needed data.

New RUBBER AND BUFF CONTACT WHEELS



Much can depend upon the character of the contact wheel used in a belt finishing job. New types of wheels have recently come into the picture, each demonstrating definite superiority on certain kinds of work. The details and characteristics of all these wheels are familiar to your BEHR-MANNING Abrasives Engineer, and a discussion with him as to which would handle your work best would be time well invested. Why not check on it?

G · TROY, N. Y. DIVISION OF NORTON COMPANY

G STONES · PRESSURE-SENSITIVE TAPES

A. CANADA: BEHR-MANNING (CANADA) LTD., BRANTFORD, ONT.

How to speed plant expansion

1. **STANDARD "SPECS" SIMPLIFY PLANNING, PURCHASING.** No need to spend weeks, months over drafting board and specifications for "piece-meal" electric system, when you order standard G-E power equipment.

2. **YOU GET EASILY-ASSEMBLED UNITS.** Instead of getting many individual items to install piece-by-piece, you get a few completely co-ordinated, easy-to-assemble units.

ONE OF WORLD'S BIGGEST MANUFACTURERS expands quickly with G-E power units, as shown above. Note that your power system can be installed *before* completing construction, giving you ample power to speed the rest of the job.

"Electric Power for Industry's Third and Biggest Expansion"

For assistance in modernizing or expanding your electrical system to meet today's greater production, send for this new 24-page booklet. Ask for Bulletin GEA-5600.

with Flexible G-E "Packaged Power"

3. **EASILY HOISTED OR PUSHED TO CONVENIENT LOCATION.** Part of flexibility is ease of movement as well as adaptability. In photo above, complete metal-clad switchgear unit is hoisted to roof.

4. **EASY INSTALLATION CONSERVES SKILLED MANPOWER.** G-E metal-enclosed switchgear units contain all needed components—all co-ordinated. Just place units in position, make circuit connections.

No matter how much more production you need now, or will need in the future, here are four good reasons for investigating General Electric's "packaged" switchgear and unit equipment today:

SAVES TIME. Order standard G-E switchgear and load-center unit substations for your entire system early—install the pre-assembled units quickly. No waiting for "missing links." Easy planning, easy installation and operation. Releases valuable time of key men for other important duties.

REDUCES COST. Cuts costs at nearly every step, from purchasing to maintenance. In many cases, load-center distribution requires 50% to 80% less copper than old-type low-voltage distribution. Flexible; eliminates expensive "hand-made" systems.

AVOIDS TROUBLE. G-E "packaged" switchgear and unit substations arrive at your plant ready for use. All components are completely co-ordinated and metal-enclosed. Helps prevent shut-downs due to power failure, provides greater personnel safety.

SAVES SPACE. No more need to clutter precious plant space with sprawling, dangerous open switchgear and wiring. G-E "packaged" units are compact, enclosed, can be put in convenient locations: near machines, in "unused corners," even on the roof.

Get your vital electric power equipment in packages. Install the units like machine tools. For more information, call your local G-E Apparatus Sales Office—or write to *General Electric Co., Schenectady 5, N. Y.*

5. **DEPENDABLE SYSTEM IN FRACTION OF USUAL TIME.** Besides quick installation with compact load-center unit substations like the one above, you get maximum protection against power failure. New units easy to add if loads grow.

6. **EASY TO MAINTAIN.** Interlocks, metal-enclosed live parts protect personnel at all times. Above, air circuit breaker draws out like file drawer for inspection.

7. **EASY TO RE-LOCATE.** When power loads shift, simply disconnect cables and move whole unit. Metal enclosure means protection in any location.

GENERAL ELECTRIC

854-39

STABILIZED CRANE PROVIDES SPEED NECESSARY FOR SALT BATH HEAT TREATING

SPEED in handling is a primary requisite when heat treating parts by the salt bath method. Cleveland Tramrail stabilized cranes are ideally suited for such work because they greatly speed handling of parts into and out of tanks.

Illustrated is an installation used for treatment of aluminum parts and sheets prior to forming. Materials are soaked in a sodium nitrate bath held at 920° F. By means of the stabilized crane parts are quenched in two cold water tanks and delivered to a point just outside of a refrigerator room. The operator takes them from the basket and quickly places them into this room where the temperature is kept at approximately zero. Total time from hot tank to cold room must be kept under four minutes, to prevent parts from hardening prematurely.

The Cleveland Tramrail stabilized crane is particularly advantageous for this work as well as for anodizing, chromodizing and other tank operations, because it will raise and lower loads quickly like an elevator, without swing.

GET THIS BOOK!

BOOKLET No. 2008. Packed with valuable information. Profusely illustrated. Write for free copy.

CLEVELAND TRAMRAIL DIVISION
THE CLEVELAND CRANE & ENGINEERING CO.
3252 EAST 284TH STREET, WICKLIFFE, OHIO

CLEVELAND TRAMRAIL
OVERHEAD MATERIALS HANDLING EQUIPMENT

HARD-N-TUFF

IS THE ANSWER TO YOUR STEEL-HARDENING PROBLEMS IN LOW-CARBON, COLD-ROLLED OR HIGH-SPEED STEELS

FOLLOW THE LEAD OF LEADING MANUFACTURERS—USE HARD-N-TUFF FOR MAINTENANCE AND PRODUCTION.

HARD-N-TUFF hardens steel quickly and inexpensively.

HARD-N-TUFF can be used successfully on all types of tools, parts, dies and other low carbon or high speed materials.

HARD-N-TUFF produces an improved quality of steel with a maximum depth of hardness. You can make your own high speed drills from ordinary carbon drills; thus treated, they will not clog or gum in plastics or other resinous material.

HARD-N-TUFF has been used with outstanding results on all types of mining, drilling and farm equipment.

HARD-N-TUFF adds certain vital chemicals which are fused deeply into the steel, effecting a complete molecular change. The outer surface becomes a far higher grade of steel, while the inner core remains tough and flexible, PROVIDING GREATER STRENGTH BACK OF CUTTING EDGES.

HARD-N-TUFF is safe to use—contains NO CYANIDE or other toxic ingredients.

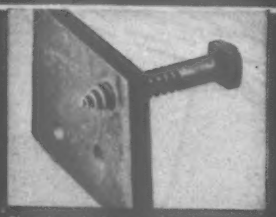
HARD-N-TUFF powder is extremely easy to use. NO SPECIAL EQUIPMENT IS REQUIRED. For small parts, all you need is a gas or acetylene torch. For larger articles, an open furnace or forge is recommended in order to get an even distribution of heat. Dip or roll the article in HARD-N-TUFF powder that's all. The entire operation takes only a few MINUTES.

HARD-N-TUFF will keep drills, chisels, cutting tools sharper, LONGER—keep machines operating longer, FASTER—cut machine shut-downs for cutting-edge replacements to an unbelievable minimum.

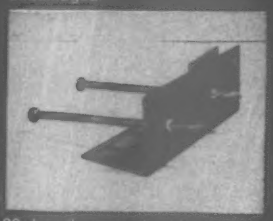
Less costly metals, such as boiler plate, hardened with HARD-N-TUFF and used for dies, drills, punches, cams, jigs, fixtures, pawls, drill bits, cutting and impact tools, will outperform and outlast the more expensive steels generally used for the same operations.

HARD-N-TUFF has gained nation-wide interest, and is used by major steel and manufacturing companies everywhere.

HARD-N-TUFF IS UNCONDITIONALLY GUARANTEED TO INCREASE THE LIFE OF TOOLS AT LEAST 300%, OR YOUR FULL PURCHASE PRICE WILL BE REFUNDED.



This lag bolt was hardened with HARD-N-TUFF and cut threads through holes in this solid steel plate with 12" wrench. Bolt threads were undamaged.



20-d nails treated with HARD-N-TUFF are driven through ⅛" hot rolled angle iron and ⅛" cold rolled steel. Points and shanks are unaffected.

This milling cutter for steel and iron had to be slowed down to 25% of normal speed. HARD-N-TUFF treated, it worked at full speed.

Chisel formed from ordinary wagon bolt. HARD-N-TUFF treated, cut 1" deep into this ¼" angle iron with 4 strokes of 3 oz. hammer.

DOUGHTY LABORATORIES, INC.
500 Fifth Avenue New York 18, N. Y.

"The cost of changing to FUSETRON dual-element FUSES has been paid for more than ten times over in sustained production time"

. . . says *Mr. John H. Van Houten,*
Superintendent
Paul Lime Plant, Paul Spur, Arizona

HERE'S HOW

"Prior to February, 1948 we used ordinary renewable fuses throughout our plant. They gave us short-circuit protection but we lost a great many motors due to single phasing, excessive heating and climatic conditions.

"When a motor goes out in a plant like ours, it costs us a loss in production that is difficult to make up.

"In February, 1948 we changed the whole plant over to Fusetron fuses. On the motors we installed a size to give motor running protection.

"We have completely eliminated motor losses due to single phasing and believe we have better all-around protection than before.

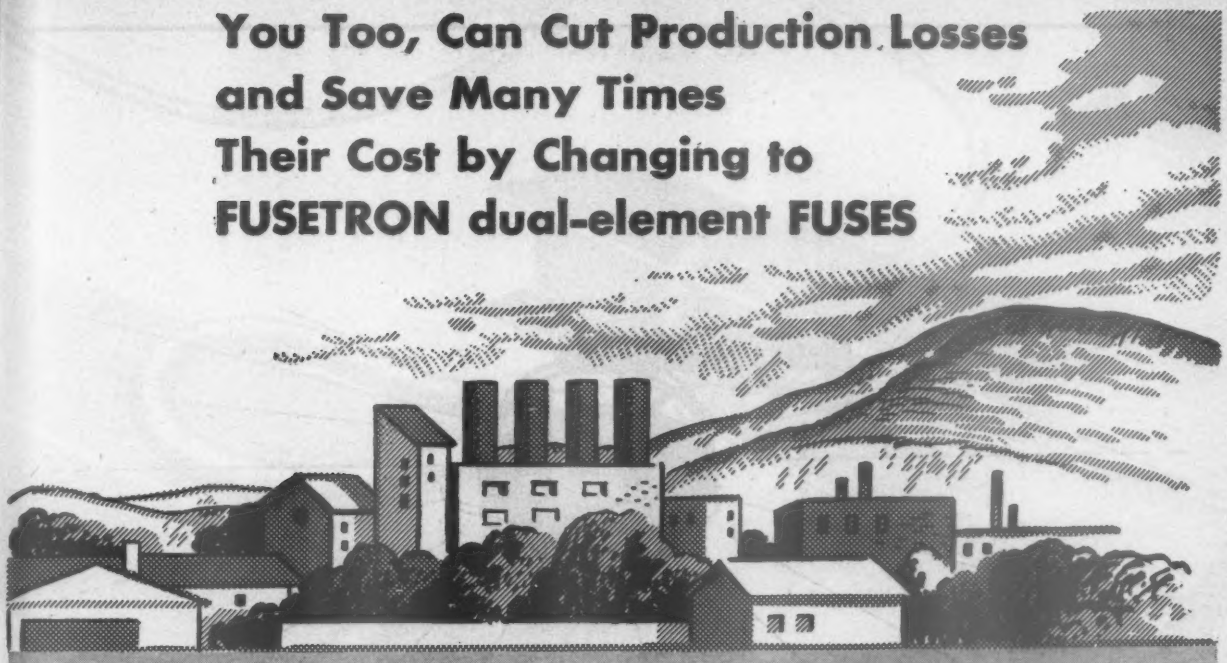
"Our records show that the cost of changing to Fusetron fuses has been paid for more than ten times over in sustained production time.

"What more could we ask?"

John H. Van Houten

(Fusetron is a trade mark of the Bussmann Mfg. Co., Division of McGraw Electric Co.)

You Too, Can Cut Production Losses and Save Many Times Their Cost by Changing to FUSETRON dual-element FUSES



HERE'S WHY

FUSETRON dual-element FUSES GIVE 10 POINT PROTECTION

1. ★Protect against short-circuits.
2. Protect against needless blows caused by harmless overloads.
3. Protect against needless blows caused by excessive heating — lesser resistance results in much cooler operation.
4. Provide thermal protection — for panels and switches against damage from heating due to poor contact.
5. Protect motors against burnout from overloading.
6. Protect motors against burnout due to single phasing.
7. Give DOUBLE burnout protection to large motors — without extra cost.
8. Make protection of small motors simple and inexpensive.
9. Protect against waste of space and money — permit use of proper size switches and panels.
10. Protect coils, transformers and solenoids against burnout.

★Fusetron fuses have high interrupting capacity as shown by tests of the Electrical Testing Laboratories of New York City in December 1947.

DON'T RISK LOSSES!

One **lost** motor . . .
One **needless** shutdown . . .
One **destroyed** switch or panel
One **burned out** solenoid . . .

May cost you far more than replacing every ordinary fuse with a Fusetron dual-element Fuse.

FUSETRON
TRUSTWORTHY NAMES IN ELECTRICAL PROTECTION
BUSS

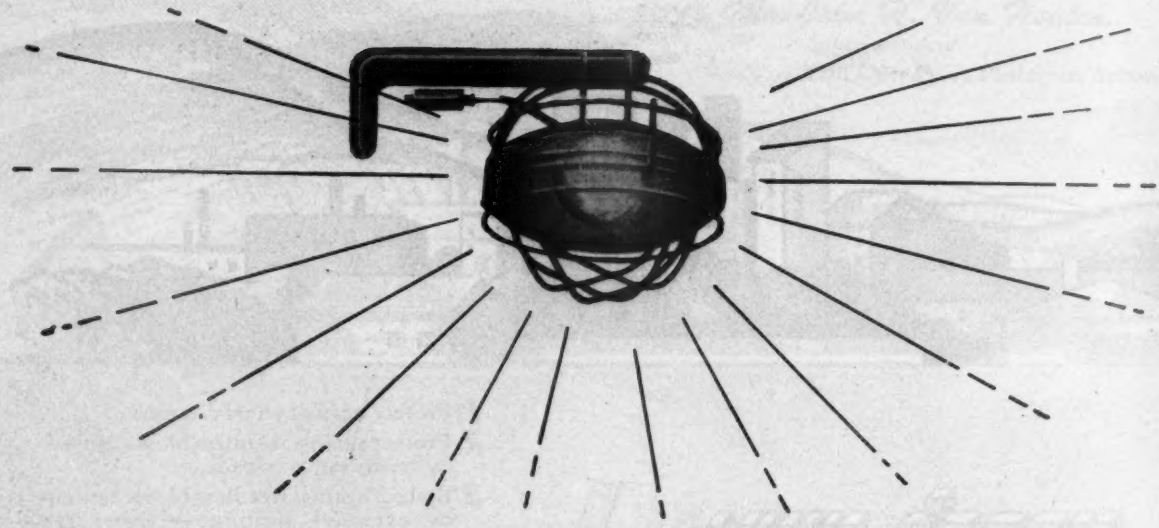
USE THE COUPON

Bussmann Mfg. Co.
University at Jefferson
St. Louis 7, Mo.
(Division of McGraw Electric Co.)

Please send me complete facts about FUSETRON dual-element Fuses.

Name.....
Company.....
Address.....
City & Zone..... State.....

1151



THE FIRE WATCH THAT NEVER SLEEPS

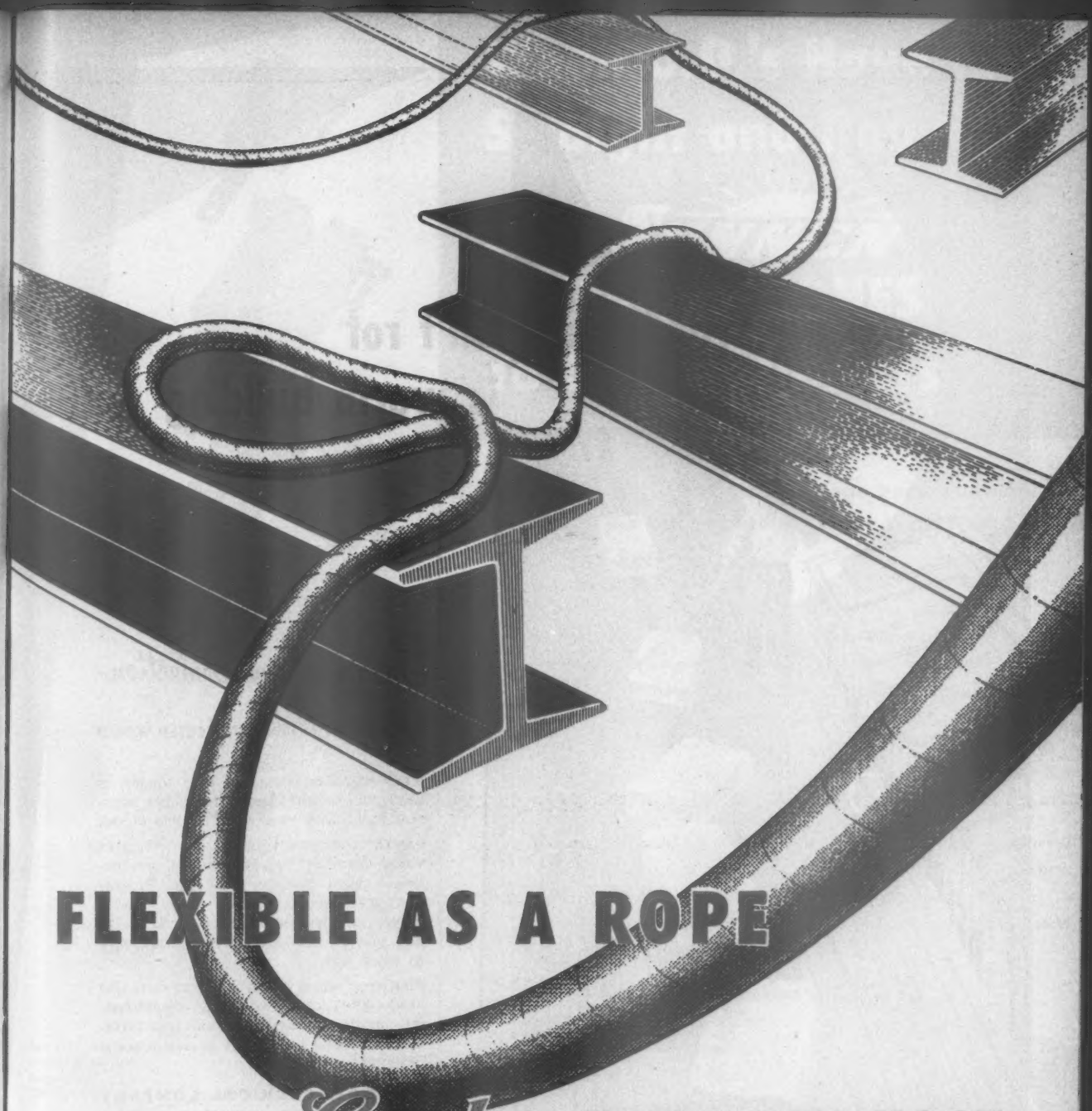
ARE you ready for fire *when* it strikes? Week ends? Nights? During shut downs? Put a Kidde Automatic Fire Extinguisher System on the job—it's *always* on the alert against fire.

The heat from a fire hits the Kidde detector . . . sends a signal that releases flame-smothering carbon dioxide automatically. Such a system can protect a single space . . . or many spaces throughout the plant.

Wherever a hazard exists—in engine rooms, fuel storage rooms, document vaults, electrical equipment—you can depend on fire-sensitive, fast-acting Kidde automatic or manual systems to protect your property. Call on us for full information.

Kidde

Walter Kidde & Company, Inc., 1132 Main Street, Belleville 9, N. J.
Walter Kidde & Company of Canada, Ltd., Montreal, P. Q.



FLEXIBLE AS A ROPE

Condor HOMOFLEX HOSE

"Why, this hose is flexible as a rope!" say the men who work with it. • But it's no surprise to us—we engineered it that way. Homoflex has no pre-set twist, it coils and uncoils easily. It doesn't kink or collapse on sharp bends. It's light, but amply strong. It's easy to handle. It's sized uniformly. Workmen like it . . . It lasts longer. • How these advantages are built into Homoflex is in Bulletin 6879 D, mailed on request. • The same engineering goes into our V-belts, flat belting and conveyor belts.

MANHATTAN RUBBER DIVISION — PASSAIC, NEW JERSEY

RAYBESTOS-MANHATTAN, INC

Manufacturers of Mechanical Rubber Products • Rubber Covered Equipment • Radiator Hose • Fan Belts • Brake Linings • Brake Blocks • Clutch Facings • Packings • Asbestos Textiles • Powdered Metal Products • Abrasive and Diamond Wheels • Bowling Balls

Only wood that won't rot is worth building with!

For your own protection

BUILD WITH *Penta*-PROTECTED WOOD

Your wood construction lasts longer, is safer, and requires less maintenance when you build with PENTA-PROTECTED wood. PENTA*, the clean wood preservative, gives wood durability, gives "termite" protection against termites and rot. PENTA-PROTECTED wood lasts up to four times longer than untreated wood. You'll also find that PENTA leaves wood clean, easy to work with.

Plan your wood construction to buy the PENTA-PROTECTED wood for longer-lasting, more economical wood protection.

*PENTA is a popular abbreviation of the chemical pentachlorophenol.

THE DOW CHEMICAL COMPANY
MIDLAND, MICHIGAN

Send for free booklet,
"Pointers on Penta"

The Dow Chemical Company
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Midland, Michigan

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Company_____ Title_____

Address_____

City_____ State_____

DOW
Penta
chlorophenol

When O.D.'s Have to be Straight and Round,

Use SUNNEN EXTERNAL HONES To Correct Defects

Four external hone sets handle complete range from .120" to 2.750".

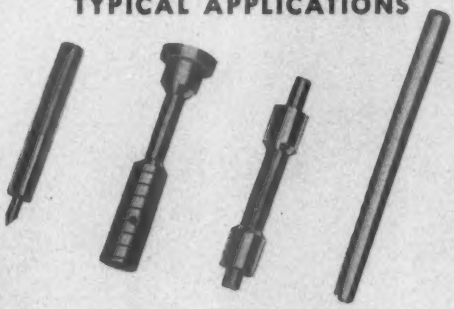
For shafts, pins, arbors, gage bars, plungers, metering rods, spindles, valve pistons and similar parts

These new honing tools correct heat treat warpage and waviness—can be used with multiple stone holders to increase the length of the honing surface, to bridge the curvature of the part and produce a straight, round outside surface. And besides correcting such geometric defects as warpage and out-of-roundness, Sunnen External Hones also remove defects in surface finish—for example, centerless grind patterns and tool marks—with minimum stock removal.

Sunnen External Hones are suitable for finishing most types of outside surfaces in a diameter range of .120" to 2.750". They hold dimensional tolerance to .0001" and better; produce surface finish as fine as 2 micro-inches RMS in hardened steel. Speed is many times faster than lapping.

Production, tool room, maintenance, salvage—any or all of these departments may have need for Sunnen External Hones. To find out more about the benefits, mail the coupon for FREE descriptive booklet.

TYPICAL APPLICATIONS



Needle Valve Metering Rod Valve Spool Gage Bar

SUNNEN PRODUCTS COMPANY
7958 Manchester Avenue • St. Louis 17, Missouri
Canadian Factory: Chatham, Ontario

To: SUNNEN PRODUCTS CO.
7958 Manchester Ave., St. Louis 17, Mo.

☐ Please send bulletin on external honing. ☐ Have representative call.

Name.....

Company.....

Address.....

City.....Zone.....State.....

How

Overhead view of assembly line showing use of industrial-type fluorescent fixtures.

Main high-voltage Westinghouse metal-clad switchgear located in boilerhouse.

Double-ended "ASL" power center with high-voltage switch at each end, dry-type transformers, and drawout metal-enclosed switchgear for low voltage distribution.

Planned Power Pays Off!

• In reduced costs
• In lower losses
• In better voltage

For Large Automobile Assembly Plant

A Westinghouse-planned power distribution system helps keep production rates high on this automobile assembly line. By carrying primary voltage to the centers of electrical load, large savings are made in costs of circuit copper and low-voltage switchgear. In addition, losses are reduced and voltage regulation is improved.

The main high-voltage, indoor, 13,800-volt metal-clad switching station controls the two incoming lines and the primary distribution feeders. At five centers of electrical load, modern metal-enclosed dry-type power centers step down to 480-volt utilization voltage.

All power centers use drawout type, 600-volt air circuit breakers for secondary circuit protection and switching. Flexible, reliable secondary distribution is obtained with three-phase metal-enclosed feeder and plug-in type bus duct.

In new building or expansion of present facilities, planned power can pay off for you, too. For further information call your nearest Westinghouse Office or write Westinghouse Electric Corporation, Agency and Construction Division, Pittsburgh 30, Pennsylvania. J-94894

Acknowledgments: J. Livingston & Co., Electrical Contractors, Boston.
Albert Kahn & Associates, Architects and Engineers, Detroit.

So much easier... It's used more often

More people use Worthington's QD sheave than any other . . . because it's *easier.*

It's the only one on the market that gives you the choice of mounting in two pieces or preassembled.

It's the only one that makes switching sheave sizes really easy—the hub stays put, there's no realignment problem.

It's the only one with a *lock* to keep the shaft key from drifting.

You'll find it's *stronger*, too. Worthington is the only manufacturer to design each size individually for the load—rather than to proportion all sizes from one design. I-beam spokes carry heavier load with less weight.

Put Worthington QD on your drives and take a load off your men. Hubs and sheaves are available in a wide range of sizes and HP.

Worthington distributors carry complete range of stock sizes. The QD design is also licensed to other sheave manufacturers with dimensions standardized for interchangeability.

Write for Bulletin V-1400-B7F. Worthington Pump and Machinery Corporation, Multi-V-Drive Sales Division, Buffalo, N. Y.

1. Light hub goes on first . . .

2. Then heavier rim slides on

3. Or mount both hub and rim together

Worthington QD

Trade Mark Pat. No. 2269821

ORIGINAL TAPERED CONE-GRIP SHEAVE

Most Widely Used Hub and Rim Combination

Split hub is clamped to shaft. Heavier taper-bored rim slides easily over tapered hub—no keyway obstruction on cone surface. Positive press fit on shaft. Large, long pull-up bolts also used as jack screws to remove rim.

WORTHINGTON

THE GOOD RIGHT HAND OF INDUSTRY

POWER TRANSMISSION: sheaves, V-belts, variable speed drives

PUMPS: centrifugal, power, rotary, steam

AIR COMPRESSORS: water-cooled, air-cooled

MV.1.BA

How to speed up speed changes

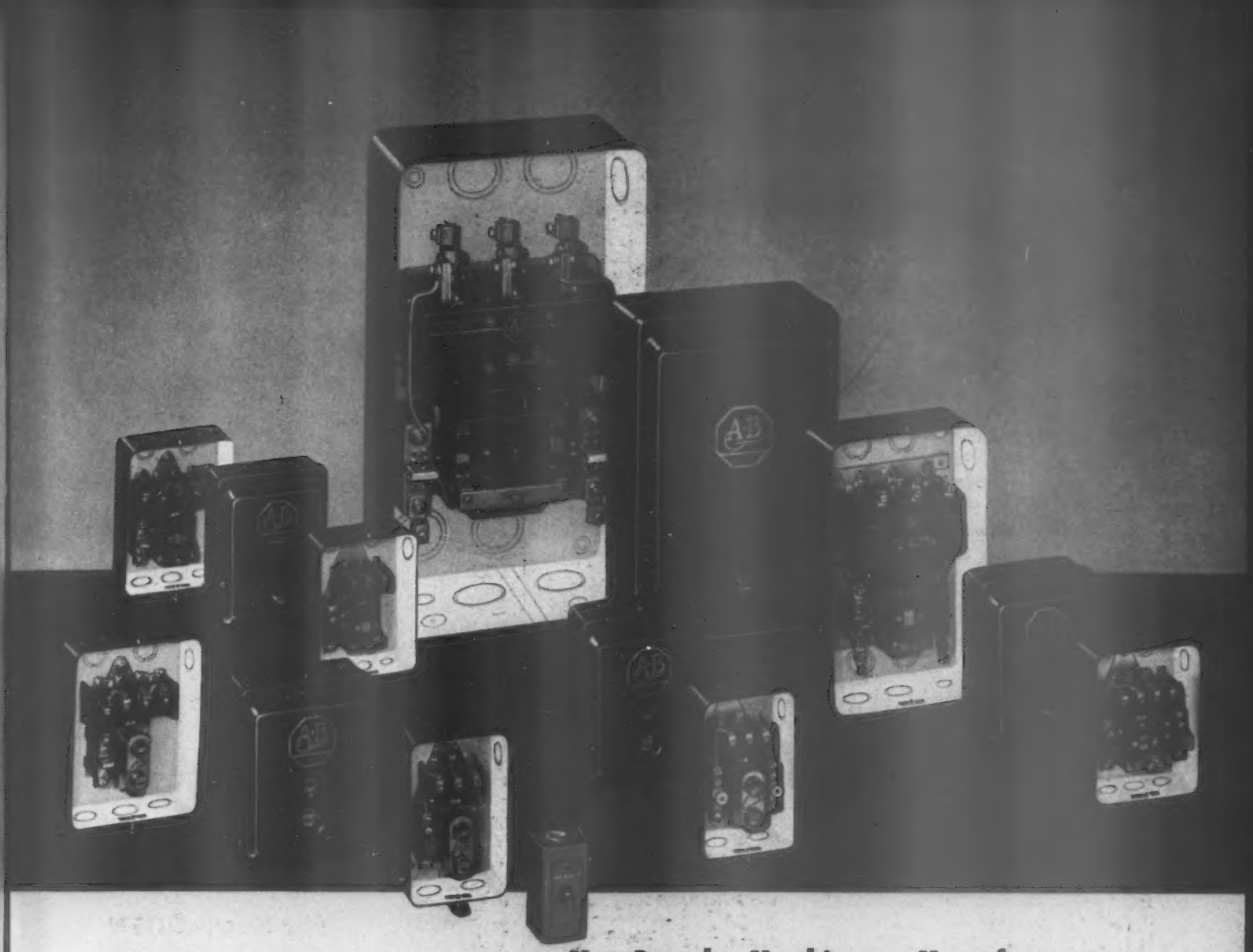
an idea "Kicked in" by a WORTHINGTON *DISTRIBUTOR*

Pye-Barker Supply Co. of Atlanta comes through with *this* idea.

Many of its textile mill customers receive orders for yarns of different sizes. In processing these different sizes, speed changes—particularly on spinning frames—must be made often and quickly.

Pye-Barker, Worthington distributor, had the answer—Worthington QD sheave—the sheave that lets you change rims for speed variation without disturbing alignment. Why? Because the hub stays in place and the new sheave bolts easily and quickly in proper alignment.

To make the operation even faster, the textile mills painted the various rims a different color, one for each speed variation required—assuring the right rim, the right speed, and proper alignment.



Mr. Resale Machinery Manufacturer . . .

Here is a full line of motor starters Manual or Automatic—Single or Polyphase

If you use different types and sizes of motor starters on your machines . . . it will pay to standardize on the A-B line.

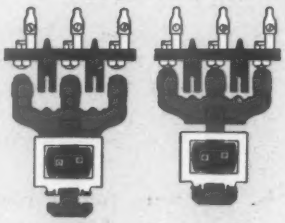
Why? Because this line is uniform in design up to 300 hp. All Allen-Bradley starters are solenoid or straight line operated . . . with maintenance free, silver alloy contacts . . . and dependable overload relays.

Allen-Bradley manual and automatic starters are nationally advertised. They are recognized the world around as *Quality Motor Controls* by important machinery buyers and plant engineers.

The Allen-Bradley Handy Catalog is an up-to-the-minute guide for efficient motor controls and accessories. Let us send you a copy of the latest edition. Write, today!

Allen-Bradley Co., 1316 S. Second St., Milwaukee 4, Wis.

751-M



SIMPLE—

Only One Moving Part

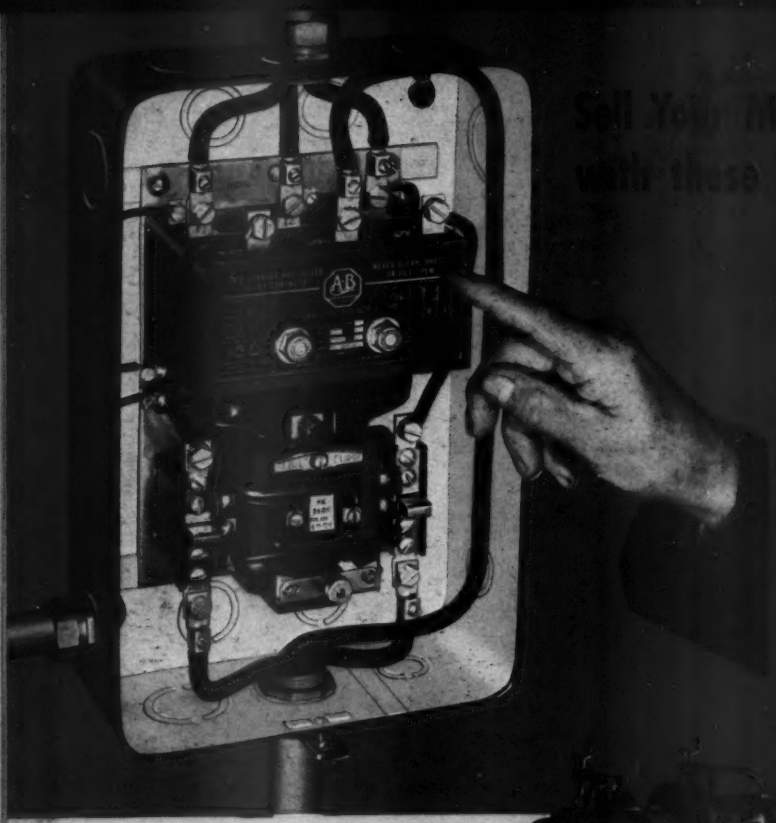
The key to the remarkable performance of Allen-Bradley solenoid starters is their simplicity. They have no pins, pivots, or bearings to stick . . . no jumpers to break.

There is just the one-piece solenoid plunger in a frictionless slide. Such simplicity means long, trouble free operation in the toughest service.

ALLEN-BRADLEY

SOLENOID STARTERS

QUALITY



Sell Your Machines "Factory Equipped" with these TROUBLE FREE STARTERS

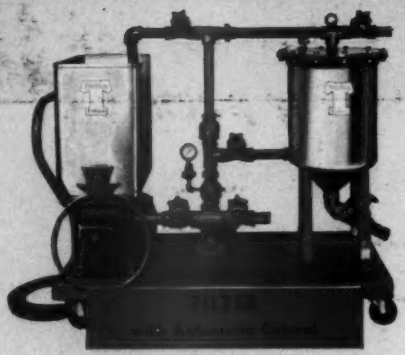
They enjoy world-wide acceptance

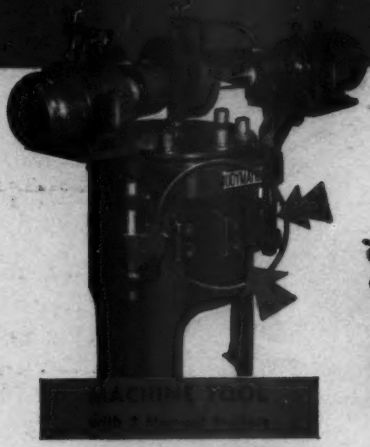
Your motorized machines are no more dependable than their motor controls. So why not add a big sales asset to your products by featuring A-B trouble free controls as standard equipment.

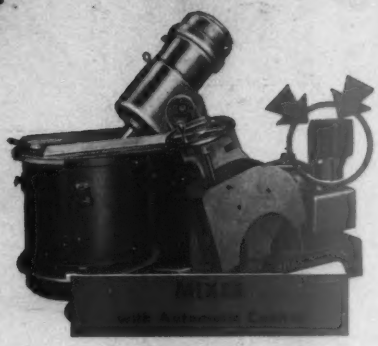
The A-B name plate means Quality controls to your customers.

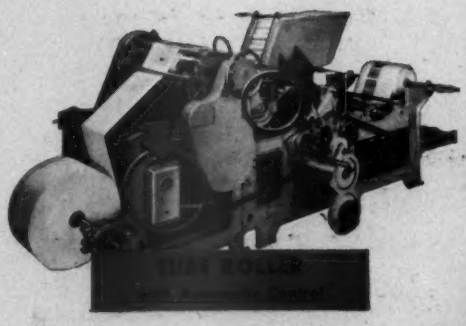
They have learned and know the operating advantages of Allen-Bradley solenoid controls—no pivots, pins, levers or bearings to corrode and stick—no contact maintenance.

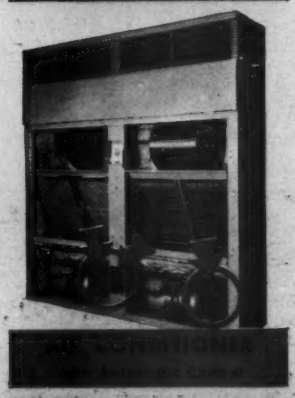
Allen-Bradley Co., 1316 S. Second St., Milwaukee 4, Wis.











751-M

Enclosures for Every Service

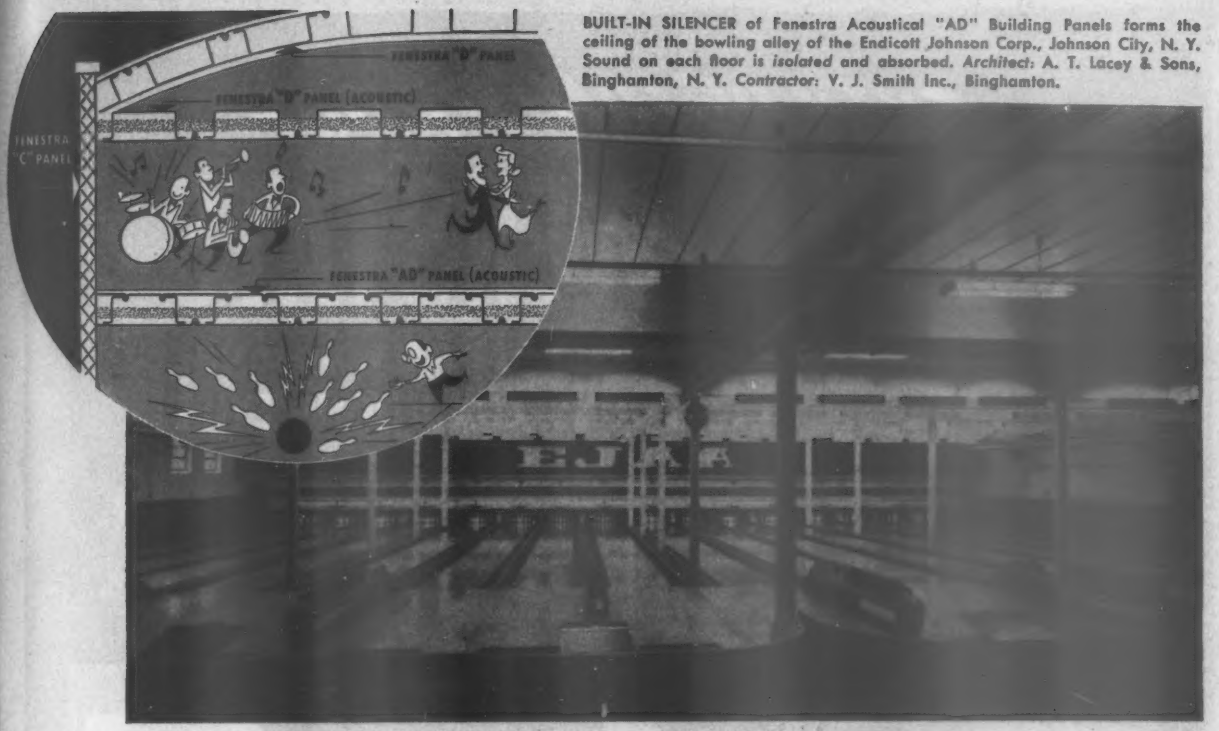
A-B Quality

Send for the Allen-Bradley Handy Catalog

ALLEN-BRADLEY

SOLENOID STARTERS

QUALITY



BUILT-IN SILENCER of Fenestra Acoustical "AD" Building Panels forms the ceiling of the bowling alley of the Endicott Johnson Corp., Johnson City, N. Y. Sound on each floor is *isolated* and absorbed. *Architect:* A. T. Lacey & Sons, Binghamton, N. Y. *Contractor:* V. J. Smith Inc., Binghamton.

LOOK! an acoustical ceiling, a floor or roof ... *all in one money-saving package!*

Now you can save time, labor, materials, *money* and get a better job to boot. Fenestra* Acoustical "AD" Panels form a *built-in* silencer with a sound reduction coefficient of 0.80! Racket is isolated in each room, and absorbed. There's your answer to a noise problem that smashes worker-efficiency to the thundering tune of a reported $4,000,000 per day.

These long-span panels are *structural.* They form a finished ceiling and subfloor, or roof. Speedily and easily erected, these long-span panels are going into every *kind* of building. You can paint them without hurting their acoustical efficiency a bit. They're noncombustible.

DETAILS ON THE FENESTRA "AD" PANEL PACKAGE:

Size: Up to 24' long, 16" wide, 3", 4½", 6" and 7½" deep. 18 to 13-gage USS steel.

Elements: Cellular panel with ⅛" holes, 946 per square foot, in bottom surface. Wire-chair insulation support. 1" thick, 4¼-lb. density glass fibre sound insulation, coated on one side.

Send coupon for details. Or call the Fenestra Representative (listed under "Fenestra Building Products Company" in your Yellow Phone Book).

*Trademark

Fenestra **PANELS • DOORS • WINDOWS**

engineered to cut the waste out of building

"D" Panels for floors, roofs, ceilings. Standard width 16". Depth 1½" to 7½".

Acoustical "AD" Panels for ceiling-silencer-roof. Width 16". Depth up to 7½".

"C" Insulated Wall Panels. Standard width 16". The depth is 3".

DETROIT STEEL PRODUCTS COMPANY
Building Panels Division
Dept. FM-11, 2266 E. Grand Boulevard
Detroit 11, Michigan

Please send me, without obligation, information on Fenestra Building Panels.

Name_____

Company_____

Address_____

EXPLOSION-PROOF POWERSTATS

excel for SAFETY wherever HAZARDOUS CONDITIONS EXIST

POWERSTAT
TYPE 1126

EXPLOSION-PROOF
POWERSTAT
TYPE X1126

THE POWERSTAT is a precision-built variable transformer operated manually or with motor drive to deliver any selected output voltage in the range from zero to or above line voltage.

EXPLOSION-PROOF means that the POWERSTAT is enclosed in a rugged cast iron housing to withstand internal gas or vapor explosions and prevent ignition of gas vapors surrounding the enclosure. Approved by Underwriters' Laboratories for Class 1, Group D service.

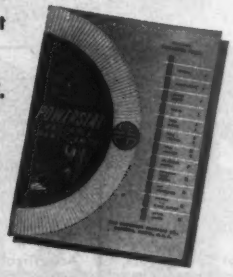
Designed for precise control of a-c power lines, Explosion-proof POWERSTATS are widely accepted and are at work in the lab, pilot and processing plants . . . providing protection in hazardous areas to men, equipment and facilities.

Explosion-proof POWERSTATS possess all the desirable characteristics found in all POWERSTATS including excellent regulation, high efficiency, conservative ratings, zero waveform distortion, smooth and dependable operation.

THIS FOLDER CAN HELP YOU SAFEGUARD PLANT INVESTMENTS

Complete with product and application information, rating charts, circuit diagrams and dimensions on variable voltage control equipment.

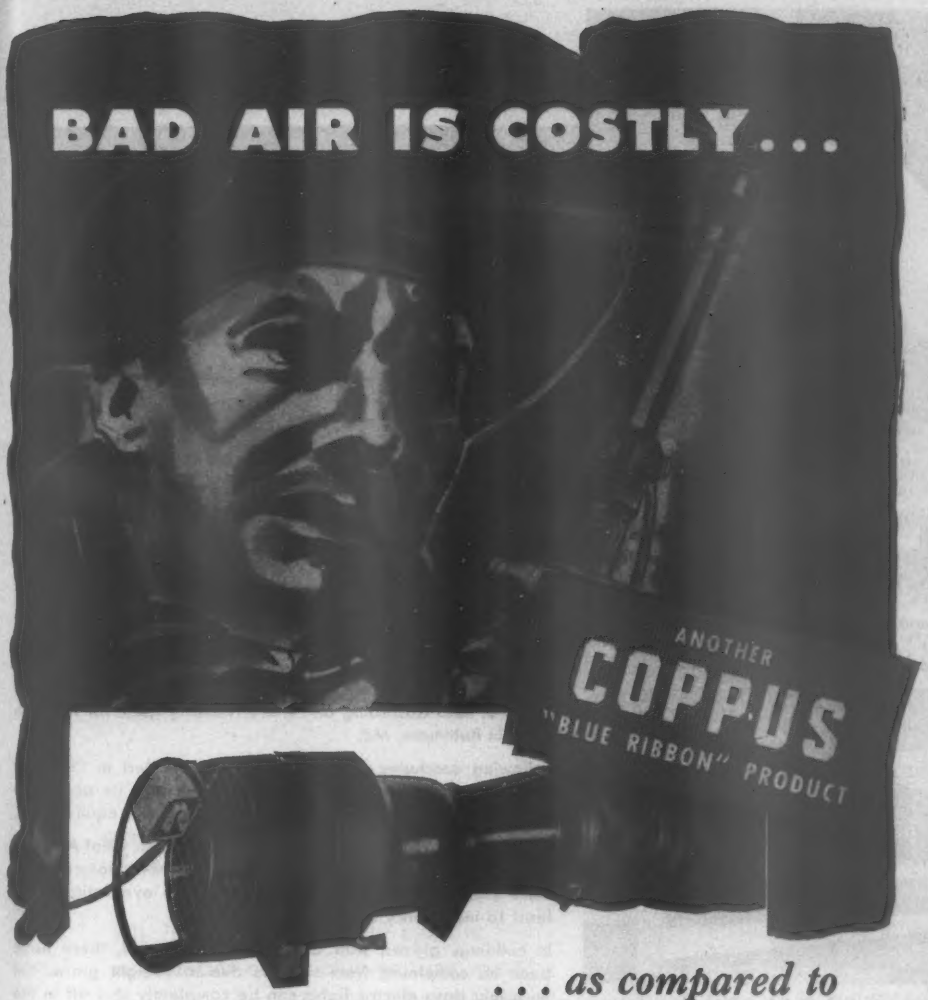
WRITE TODAY, SECO, 1411 CHURCH ST., BRISTOL, CONN.



THE SUPERIOR ELECTRIC CO.
BRISTOL, CONNECTICUT

POWERSTAT VARIABLE TRANSFORMERS • VOLTBOX A-C POWER SUPPLIES • STABILINE VOLTAGE REGULATORS

BAD AIR IS COSTLY...



... as compared to the blower that keeps air fresh

Your men can't produce at top efficiency when stagnant, hot or fume-filled air robs them of their energy.

Wherever bad air slows down production . . . in shipholds, tanks, drums, boilers or other places where men need fresh, cool air . . . a Coppus Blower becomes both a safety device and a production tool.

Portable and easily adaptable for special purposes, Coppus "Blue Ribbon" Blowers and Exhausters fit all your "fresh air" requirements. The Coppus "Blue Ribbon" means premium performance at ordinary cost. Check and mail the coupon for specific information. Sales offices in THOMAS' REGISTER. Other "Blue Ribbon" Products in CHEMICAL ENGINEERING CATALOG, REFINERY CATALOG, BEST'S SAFETY DIRECTORY, MINING CATALOGS.

OTHER
COPPUS
"BLUE RIBBON"
PRODUCTS

HORIZONTAL TURBINE
Six frame sizes
1 to 150 horsepower

VERTICAL TURBINE
Six frame sizes
1 to 150 horsepower

FANMIX GAS BURNER

FANMIX OIL BURNER

MAIL THIS COUPON To Coppus Engineering Corp., 111 Park Avenue, Worcester 2, Mass.

PLEASE SEND ME INFORMATION ON SUPPLYING FRESH AIR TO MEN WORKING:

- ☐ in tanks, tank cars, drums, etc.
- ☐ in underground cable manholes.
- ☐ in aeroplane fusilages, wings, etc.
- ☐ on coke ovens.
- ☐ on steam-heated rubber processes.
- ☐ on boiler repair jobs.

COOLING:

- ☐ motors, generators, switchboards.
- ☐ wires and sheets.
- ☐ general man cooling.
- ☐ around cracking stills.
- ☐ exhausting welding fumes.
- ☐ stirring up stagnant air wherever men are working or material is drying.
- ☐ drying of walls, sheets; etc., after treated with coating material.

NAME .....

COMPANY .....

ADDRESS .....

CITY .....

(Write here any special ventilating problem you may have.)

Designed and built by The Glenn L. Martin Co. for destruction of enemy denizens of the deep, this P-5M-1 Marlin anti-submarine seaplane is one of many being readied for use by the U. S. Navy.

Prominent Aircraft Manufacturer Selects COOLITE

Heat Absorbing and Glare Reducing GLASS

Over 90,000 sq. feet Glazed in Three Exposures in Glenn L. Martin Buildings

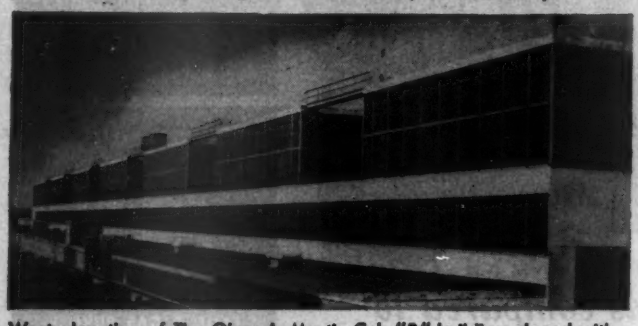
Appreciation of the vital role played by regulated daylighting in keeping production at high level prompted management of The Glenn L. Martin Company to explore thoroughly the advantages of heat absorbing and glare reducing glass for its huge plant in Baltimore, Md.

Following conclusive tests, Coolite was specified in "B" and "C" buildings where it has since demonstrated its ability to control sunlight and solar heat to meet exacting requirements.

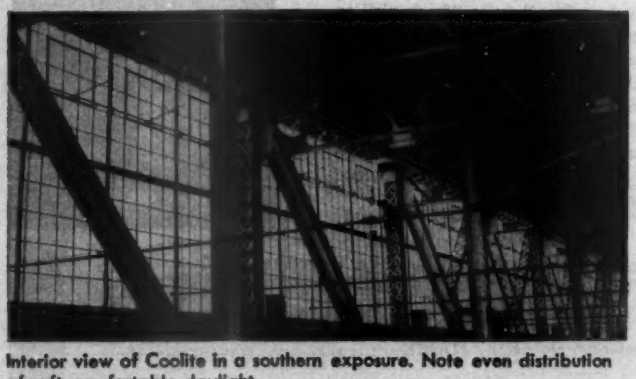
According to Martin Company executives, Coolite, Heat Absorbing and Glare Reducing Glass admits maximum natural light while excluding blinding sun rays that cause eye fatigue and lead to inefficiency and production declines.

In buildings glazed with Coolite, glare reduced, there have been no complaints from workers due to sunlight glare. Yet on bright days electric lights can be completely shut off in the final assembly areas. As a result, the company considers Coolite glass indispensable in all the south, west and east exposures of its buildings.

Like many others you too may find that whether used in new construction or modernization, Coolite, Heat Absorbing and Glare Reducing Glass can provide increased efficiency and economy. For details, see your nearby Mississippi Glass distributor.



West elevation of The Glenn L. Martin Co's "B" building glazed with Coolite, Heat Absorbing and Glare Reducing Glass.



Interior view of Coolite in a southern exposure. Note even distribution of soft, comfortable daylight.

Rolled, Figured and Wired Glass by Mississippi is *"Visioneered"* for better daylight illumination. Available in a variety of patterns and surface finishes, all scientifically designed to distribute light to best advantage.

MISSISSIPPI *Glass* COMPANY

88 ANGELICA ST. SAINT LOUIS 7, MO.

NEW YORK • CHICAGO • FULLERTON, CALIF.

Send for free catalog, "Coolite Heat Absorbing and Glare Reducing Glass."

Samples on request.

WORLD'S LARGEST MANUFACTURER OF ROLLED, FIGURED AND WIRED GLASS

FRONT SIDE OF TOOLING AREA 1¼-SIX

REAR SIDE OF TOOLING AREA 1¼-SIX

THE IMPORTANT REQUIREMENT

All brands of multiple spindle bar automatics offer value or they would not be on the market. If it were possible to engineer and incorporate the superior qualities of all into one machine, certain features would still be considered more important than others in accordance with the individual buyer's requirements.

But there is one essential quality required of all brands—regardless of the job. It is *dependable, low cost performance!* CONOMATIC users know well its benefits. But you don't have to be a user to know about this feature, or any other feature, of the CONOMATIC. Just write, wire, or phone for the information. There is no obligation.

Cross drilling without costly spindle stopping is one of many CONOMATIC innovations which make use of the machine's unexcelled accommodation to tools and work. But any such facility that saves secondary handling is valuable only because of the more important "built in" qualities that keep the machine running.

A Comparison of ALL Automatics is in favor of Cone

Conomatic

CONE AUTOMATIC MACHINE COMPANY, INC.
WINDSOR, VT., U.S.A.

WIRE ROPE

ROEBLING ALL-PURPOSE SLINGS with the Tapered Sleeve Splice come to you ready for the job. They cost less than tucked splices... have the full strength of the rope. Send for the full story.

You'll get more efficient, economical service with ROEBLING rope

TIME AND DOLLAR SAVINGS are more important than ever in industrial operations. One sure way to save time and cut costs is to specify Roebling Preformed "Blue Center" Steel Wire Rope. Here's a tough rope that stands up under shocks, acceleration stresses, excessive abrasion and bending. Its preforming assures maximum handling ease, better spooling and smooth performance.

Roebling makes a complete line of wire rope. Have your Roebling Field Man recommend the *right* ropes for your requirements. And for longest life on the job, get his advice on the correct use and maintenance of wire rope. John A. Roebling's Sons Company, Trenton 2, New Jersey.

ROEBLING

Atlanta, 934 Avoir Ave ★ **Boston**, 51 Sleeper St ★ **Chicago**, 5525 W. Roosevelt Rd ★ **Cincinnati**, 3253 Fredonia Ave ★ **Cleveland**, 701 St. Clair Ave, N.E. ★ **Denver**, 4801 Jackson St ★ **Detroit**, 915 Fisher Building ★ **Houston**, 6216 Navigation Blvd ★ **Los Angeles**, 216 S. Alameda St ★ **New York**, 19 Rector St ★ **Odessa, Texas**, 1920 E. 2nd St ★ **Philadelphia**, 230 Vine St ★ **San Francisco**, 1740 17th St ★ **Seattle**, 900 1st Ave, S. ★ **Tulsa**, 321 N. Cheyenne St ★ Export Sales Office, **Trenton, N. J.**

Method IA for protecting a precision part: first the part is completely immersed in rust preventive; after the rust preventive has set, the part is enclosed in a pre-cut wrapper; then the part is lap-dipped in a special sealing compound.

Method IA for protecting a carton: first the part is placed in the carton; next the carton is enclosed in pre-cut and folded strips of wrapper and sealed at all seams; then the package is lap-dipped in sealing compound and the carton is safe for shipment.

Dearborn . . . headquarters for packaging to
government specifications

If you are packaging machines and equipment to government specifications, Dearborn can help you.

Illustrated above are graphic demonstrations of the widely known Method IA . . . typical uses of the government specified packaging materials that are available from Dearborn. Broadly, these government specified materials include rust preventives, wrappers, sealers, case liners and fingerprint neutralizers. Other Dearborn materials include cleaners, rust removers and VPI, the specially treated paper that gives off an invisible protective vapor.

Why not discuss this important matter with a Dearborn packaging engineer? He will gladly assist you in setting up a packaging procedure that fully meets government specifications . . . one that will assure the corrosion-free arrival of your products at their destination.

This booklet will help you

The new edition of "Preventing Corrosion in Export Packaging" gives you: (1) current government specifications; (2) cleaning methods; (3) approved packaging methods; (4) how to apply rust preventives; (5) how to wrap, seal and dip parts; and (6) other valuable information with step-by-step picture stories. Write for it today.

DEARBORN CHEMICAL COMPANY
Merchandise Mart Plaza • Chicago 54, Illinois

Dearborn
Reg. U.S. Pat. Off.

NO-IRON OX-ID RUST

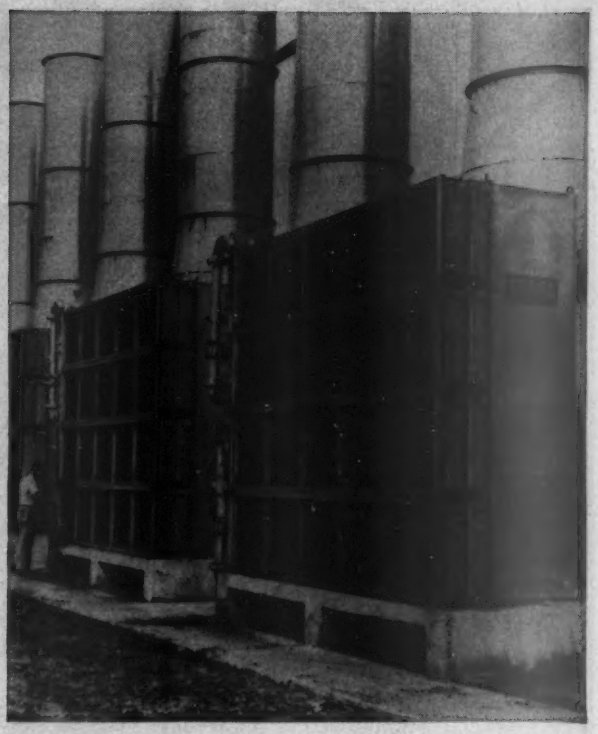
THE ORIGINAL RUST PREVENTIVE

Dearborn Chemical Company, Dept. F
Merchandise Mart Plaza, Chicago 54, Ill.

☐ Please send a copy of "Preventing Corrosion in Export Packaging."

☐ Have a Dearborn Representative call.

Name.....
Company.....
Title.....
Address.....
City.....State.....



Laboratory . . . Reduction Plant . . . Assembly . . . Dock . . . Service Station

Trane Air Conditioning Serves Everywhere in Industry

Industries of every kind and size are finding the answers to their heating and air conditioning problems in the broad Trane line.

Constant Temperature Fog Room—A cement manufacturer wanted to test concrete specimens under extreme humidity conditions, at constant temperatures. Trane Climate Changers kept the test room at 73° constantly the year around.

To Cool Gas Engines—The location of a new aluminum reduction plant in the south had plenty of natural gas and good transportation. But there was no water to cool the 120 1800-hp engines used for power. This situation was remedied when 120 Trane Fluid Coolers were installed to keep jacket water at just the proper temperature.

Window Blanketing — The windows in the new plant of a scale manufacturer admitted plenty of light to a delicate assembly line. But the great glass area created greater possibilities for drafts. That is until Trane Wall-Fin Heaters were installed to blanket the windows with heat without obscuring the light.

Washing the Walls with Heat — Long loading docks, like the one in a Michigan chemical plant, call for a lot of heat to combat the cold air from constantly opened doors. A battery of Trane Horizontal Unit Heaters wash the exposed walls and blanket the doorways with all the heat that's needed.

Tempering Freezing Air — The diesels of a famous railroad discharge a lot of gas-laden air as they enter a terminal service station. As the bad air is exhausted, clean outside air is brought in and heated with Trane Nonfreeze Heating Coils.

Whether it's laboratories, reduction plants, assembly, docks or service stations, Trane air conditioning serves industry everywhere.

Whatever your factory heating, ventilating, cooling or air conditioning problem, look for the answer in the complete Trane line.

In Assembly Departments—Trane Wall-Fin Heaters are tucked up under the girders.

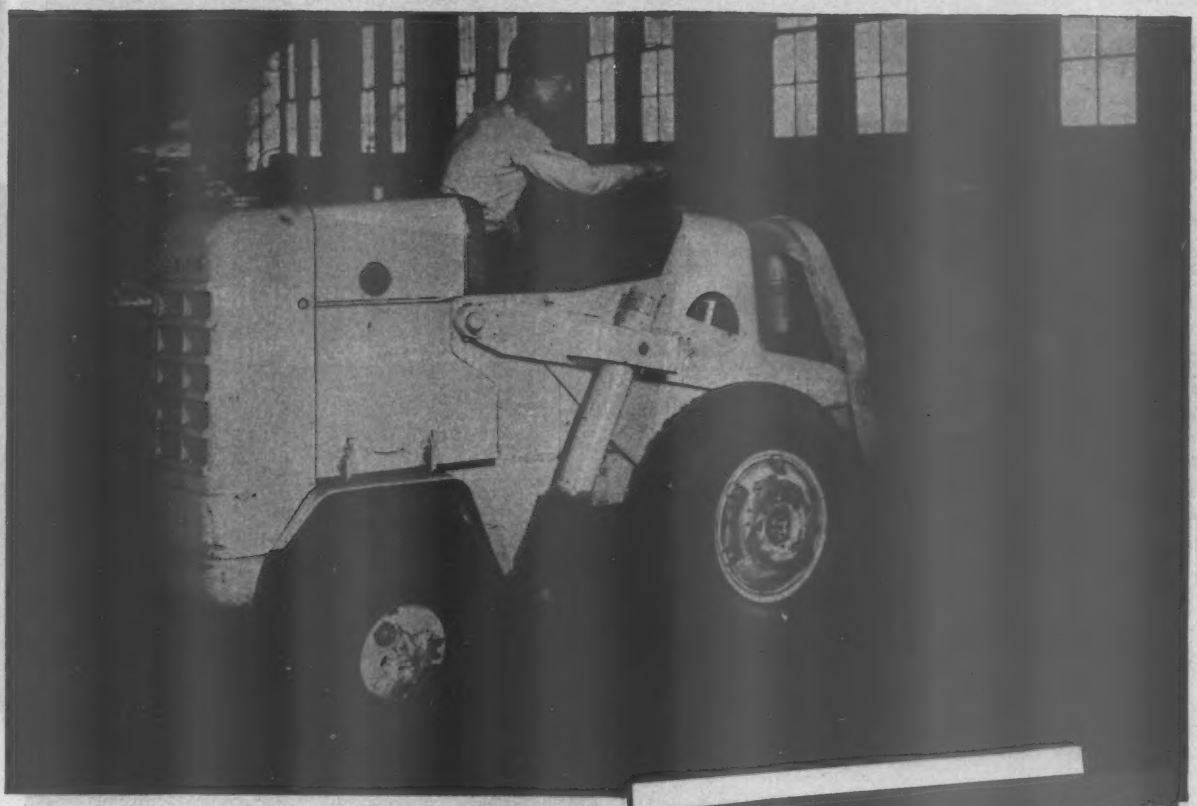
In Loading Areas—Trane Horizontal Propeller Unit Heaters kill drafts before they start.

In Service Stations—Cold outside air is heated with Trane Coils before it is used for ventilation.

TRANE

MANUFACTURING ENGINEERS OF HEATING, VENTILATING AND AIR CONDITIONING EQUIPMENT

THE TRANE COMPANY, LA CROSSE, WIS.
Eastern Mfg. Division, Scranton, Pennsylvania
Trane Company of Canada, Ltd. . . . Toronto
OFFICES IN 80 U. S. and 14 CANADIAN CITIES



mechanize your manpower

Take the shovel out of a man's hand and put him on the seat of a PAYLOADER. He'll show you how to lick rising costs, how to increase output and solve manpower shortages. Thousands of plants with bulk materials to handle have taken this step with highly gratifying results. And PAYLOADERS can do so many jobs that there is hardly any limit to their usefulness.

Every PAYLOADER is a complete Hough-built tractor-shovel specifically designed with multiple reverse speeds and other features that insure fast, low-cost bulk material handling. There are several sizes from the 12 cu. ft. Model HA shown, up to 1½ cu. yd. bucket capacity. They are also available in front-wheel, rear-wheel and four-wheel-drive models.

Every PAYLOADER is backed by 30 years of material handling equipment manufacture and a Hough Distributor with complete parts and service facilities. The Frank G. Hough Co., 755 Sunnyside Avenue, Libertyville, Illinois.

On These Jobs

- Unload box cars.
- Dig and carry fertilizers, chemicals, all loose materials.
- Transport and distribute materials from storage to process.
- Unload trucks.
- Load box cars.
- Feed conveyors, hoppers, baggers, elevators.
- Stockpile coal and all kinds of raw materials.
- Clean up gangways, aisles and other areas.
- Handle coal, coke, ashes, cinders.
- Carry bagged materials, bales, barrels.
- Maintain private roadways.
- Do cranework — haul, push.
- Remove snow.

HELP for your material handling problems is found in "Industrial Handling" the free Hough magazine. Catalog on any size PAYLOADER is available, without obligation.

PAYLOADER®

THE FRANK G. HOUGH CO. • Since 1920

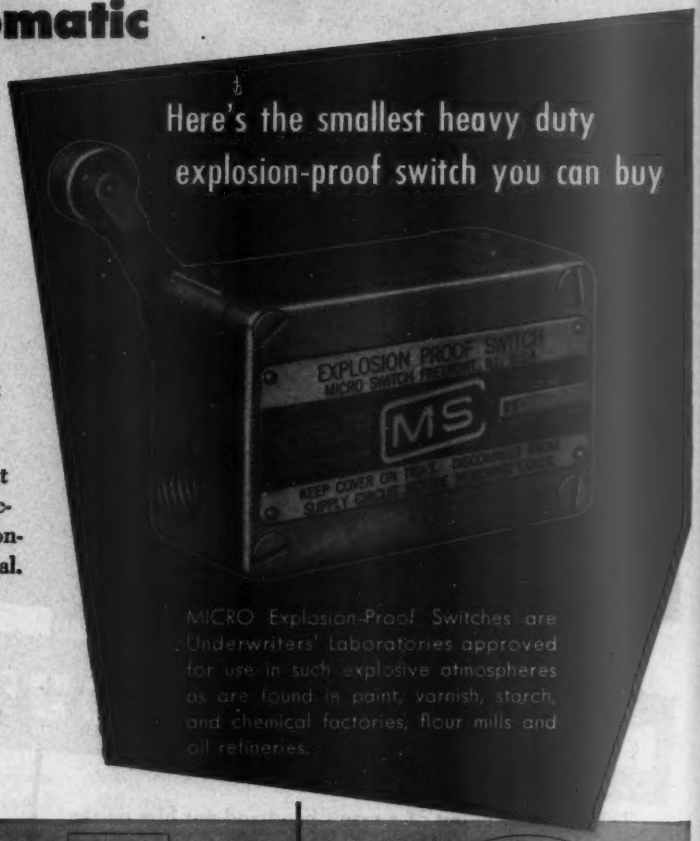
There's a MICRO Precision Switch to make YOUR operations safer and more automatic

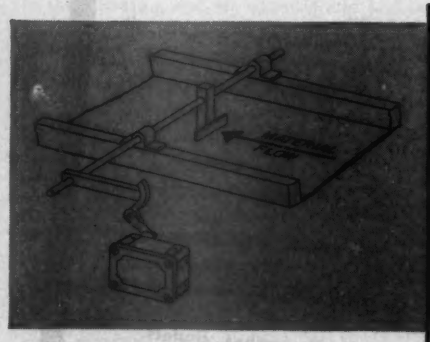
It's easy to apply MICRO precision switches to your present equipment. They are available in a wide variety of housings, mountings and actuators that permit quick and convenient installation.

On this page we illustrate three different uses of three different MICRO products which have resulted in making equipment safer and more automatic.

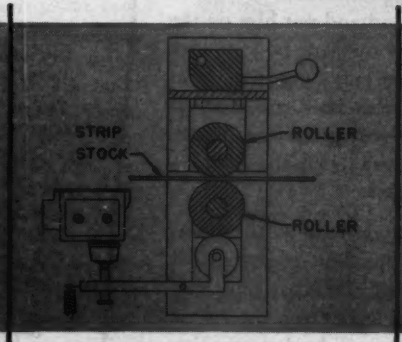
There are MICRO precision switches that will make your old equipment more productive by the addition of a new automatic control, a new safety limit or a new warning signal.

Look in your classified telephone book for your MICRO SWITCH Distributor. They are located in over 120 cities to serve you.

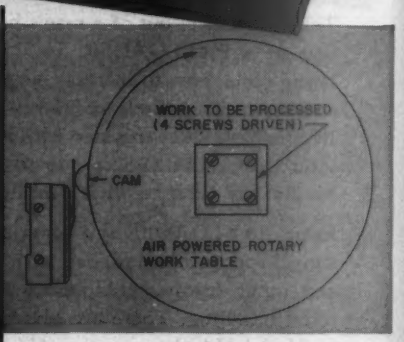

Here's the smallest heavy duty explosion-proof switch you can buy
EXPLOSION PROOF SWITCH
MS
MICRO Explosion-Proof Switches are Underwriters' Laboratories approved for use in such explosive atmospheres as are found in paint, varnish, starch, and chemical factories, flour mills and oil refineries.



To prevent overloading a belt conveyor feeding a bucket elevator, a paddle was set at the maximum material depth on the conveyor. Overloading the belt moves the paddle and trips the MICRO Explosion-Proof Switch, stopping conveyor motor and sounding alarm.



Variations in the thickness of stock in this rim rolling machine, if too great, will depress the lower roller. This actuates the MICRO sealed-type switch which shuts off the motor, preventing damage to rolls, shaft or bearings.



Leaf-actuated MICRO precision switch is actuated by cam on air-powered rotary work table so as to break the current and stop the table at the exact "home" position before the next cycle is started.

MICRO MS SWITCH

FREEPORT, ILLINOIS

What is a new plant idea worth? *Read "MICRO TIPS"*

"MICRO TIPS" is a real gold mine of ideas on how to make plant equipment more productive. Send for your copy today. You'll be glad you did.

A DIVISION OF MINNEAPOLIS-HONEYWELL REGULATOR COMPANY

SCINTILLA MAGNETO DIVISION OF BENDIX AVIATION CORPORATION USES UDYLITE EQUIPMENT AND PROCESSES TO SAFEGUARD VITAL AIRCRAFT IGNITION PARTS

Udylite plating installation at Scintilla Magneto Division of Bendix Aviation Corporation showing ignition connectors of the Lockheed F-90 Fighter being processed.

Spark of life to military aircraft—both jet and propeller driven—is the electrical system. Failure can be fatal, so the Scintilla Magneto Division gives the metal of ignition connectors a protective coating against rust and corrosion with Udylite plating equipment and processes.

Here you have an example of how Udylite is helping beat the ploughshares of peace into the swords of war. In defense weapons, ranging from side arms to submarines, you'll find that Udylite precision-plating is making an important contribution to national defense.

If you have a defense job that involves metal finishing, your Udylite Technical Man can lend you the experience gained in World War II when Udylite developed new machines and methods for bettering the plating of the tools of war. Call him today and state your problems. Or write direct to *The Udylite Corporation, Detroit 11, Michigan.* There's no obligation.

THE Udylite CORPORATION
DETROIT 11, MICHIGAN

PIONEER OF A BETTER WAY IN PLATING

Speed Nut Savings Stories

Etling opens the window to GREATER PROFITS

Here's how Weatherseal, Inc., cut costs 43% in jamb assembly of Etling In-Swinging Windows

● The ingenious Etling in-swinging window short-cuts the tedious, sometimes dangerous, chore of washing windows.

Etling and Tinnerman engineers put their heads together to determine a quicker way to fasten the side jamb assemblies. RESULT: *Not only did the 16 SPEED NUTS specified replace 32 other fasteners, they also eliminated the need for $3600 worth of assembly equipment, and broke an assembly line bottleneck. All this added up to a handsome 43% savings in the cost of assembling side jamb sections.*

Weatherseal also reports that product quality was greatly improved and assemblers picked up speed which ultimately put more dollars in their pay envelopes.

Perhaps you are seeking short cuts that pay off like this. Just indicate your interest by calling in a Tinnerman representative or writing us for information on our comprehensive Fastening Analysis Service. Also ask for your copy of "Savings Stories," factual case history booklet. TINNERMAN PRODUCTS, INC., Dept. 12, Box 6688, Cleveland 1, Ohio. In Canada: Dominion Fasteners Limited, Hamilton. In Great Britain: Simmonds Aerocessories, Limited, Treforest, Wales.

OLD METHOD
Special T-shaped nut stapled in place took almost 3 times as long and was not always secure.
SPEED NUT METHOD
16 SPEED NUTS are quickly pushed into side jambs from the assembly side of the job. No special equipment required. SPEED NUT impression then receives screw and locks tight in final assembly step.
Etling double hung window swings in for easy cleaning. Brass side runs also act as hinges and can be adjusted.

A "new dimension" in merchandising served by Georgia-Pacific

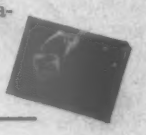
HOW TO CASE THE JOINT FOR THE CARRIAGE TRADE!

As every true Texan and most "foreigners" well know, the trading post of Neiman-Marcus has no peer in Texas or in the United States.

"Texans", the store says in effect, "can afford to have, and insist on having, the best of everything." And Neiman-Marcus gives it to them. The whole store and everything in it is the last word in merchandise and merchandising methods. Ingenious showcases literally make merchandise irresistible. Customers see—and buy from—fixtures and displays built of luxurious hardwood plywood.

A leader in the field in helping merchandisers put a new lift into sales is Georgia-Pacific's CROWNPLY, beautifully grained plywoods of Gum, Oak, Walnut, Mahogany, Birch and other woods.

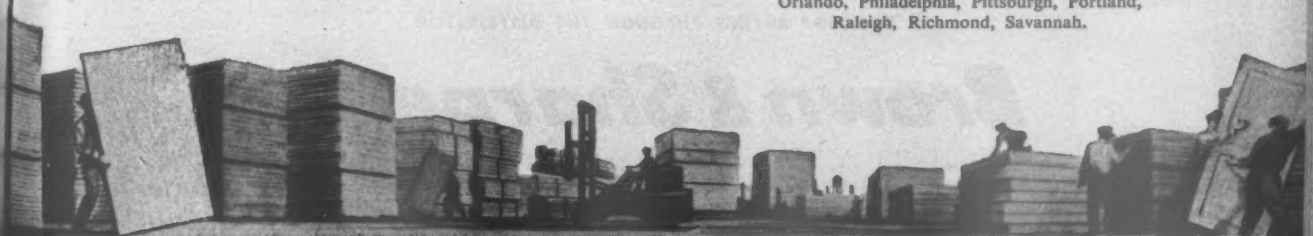
G-P Crownply comes in a wide range of standard and exotic hardwoods, carefully selected and precision-manufactured in Georgia-Pacific's ultra-modern mill in Savannah. Now in preparation is a G-P Crownply brochure which should serve you as a useful buying guide. Write Georgia-Pacific, 641 North Capitol Way, Olympia, Wash., for your copy now, and it will be sent as soon as it is off the press. Or get in touch with your nearest Georgia-Pacific office.



GEORGIA—PACIFIC

PLYWOOD COMPANY

OFFICES OR WAREHOUSES IN: Augusta, Birmingham, Boston, Chicago, Columbia, Louisville, Memphis, Nashville, Newark, Olympia, Orlando, Philadelphia, Pittsburgh, Portland, Raleigh, Richmond, Savannah.



DOUGLAS FIR PLYWOOD • HARDWOOD PLYWOOD • SPX • SOUTHERN & WESTERN LUMBER • DOORS

Clean-Cutting,
Long-Wearing Cutters that
turn out high production
at top efficiency
The complete line of quality cutters made by Brown & Sharpe is designed to help you get top machine productivity at all times. Their longer wearing qualities mean a longer period of efficient cutting between sharpenings.
Styles include every type from plain milling cutters and end mills to metal slitting saws and cutters for special uses. Write for complete catalog.
Brown & Sharpe Mfg. Co.,
Providence 1, R. I., U. S. A.
WE URGE BUYING THROUGH THE DISTRIBUTOR
Brown & Sharpe
B·S

COMPLETE *Finishing* SYSTEMS

for ENAMEL • LACQUER • PAINT

Entrance End of Mahon Hydro-Filter Spray Booths at Revco, Incorporated, Manufacturers of Home Food Freezer Cabinets and Other Products.

Interior of Mahon Hydro-Filter Spray Booths at Revco, Incorporated. Note New "Hydraire" Flood Sheets which make for better working conditions.

Home Freezer Parts Emerging from Mahon Hydro-Filter Spray Booths at Revco, Incorporated, and Entering Finish Bake Oven Located Overhead.

. . . the EXPERIENCE that goes into the PLANNING and ENGINEERING of MAHON EQUIPMENT is the item of GREATEST VALUE to YOU!

Home Freezer Parts at Revco, Inc., Emerging from Mahon Five Stage Cleaning and Rust Proofing Machine and Entering Dry-Off Oven Located Overhead.

Modern Equipment at REVCO, Inc., Reduces FINISHING COSTS . . . Produces FINER FINISH!

Major units of the Complete Mahon Finishing System at Revco, Inc., Deerfield, Mich., are illustrated here. The System provides for continuous processing through Cleaning, Rust Proofing, Drying, Painting and Finish Baking—all on a single conveyor line . . . it reduces costs to a minimum, and, through better control of each phase of the finishing process, it produces a finer finish. It is another typical example of cooperation on the part of Mahon engineers in planning a system complete in every detail, yet so compact that it occupies a minimum of floor space. Some of the novel features of the system are the new Mahon "Fire-Jet" Heaters on processing solution tanks, and the new Mahon "Hydraire" Flood Sheets in the Spray Booths, which make for improved working conditions. When you are in need of finishing equipment you can't do better than to rely on the recommendations of Mahon engineers, because, Mahon engineers have pioneered development in this highly specialized field for over thirty years . . . they have accumulated a wealth of technical knowledge and practical know-how not available to you elsewhere. See Mahon's Insert in Sweet's Mechanical Industries File, or write for Catalog A-652.

THE R. C. MAHON COMPANY

HOME OFFICE and PLANT, Detroit 34, Mich. • WESTERN SALES DIVISION, Chicago 4, Ill.

Engineers and Manufacturers of Complete Finishing Systems—including Pickling Equipment, Metal Cleaning and Rust Proofing Equipment, Dry-Off Ovens, Hydro-Filter Spray Booths, Filtered Air Supply Systems, and Drying and Baking Ovens; Core Ovens, Hydro-Foam Dust Collectors, Fog-Filters, and other Units of Special Equipment.

MAHON

UNSURPASSED INSPECTION VERSATILITY

With Jones & Lamson Optical Comparators

PRODUCTION INSPECTION ON THE SPOT

TOOLROOM CHECKING OF EVERY KIND

LABORATORY GAGING WITH SPEED AND PRECISION

★ They meet the requirements of toolroom, laboratory and production inspection.

★ They precisely measure height, depth, lead or spacing, as well as angles to degrees and minutes.

★ They compare intricately contoured parts with a master outline – and measure the amount of error.

★ They are convenient to operate, easy to set up and read direct – without computation.

★ They will photograph the enlarged shadow and record its relationship to a master chart.

★ They will operate under normal lighting conditions. No dark room is needed.

★ Several persons may study the shadow at the same time.

★ They will inspect and measure surfaces, as well as profiles, of objects such as type faces, stamping dies, punches, worn tools, etc.

Jones & Lamson Optical Comparators are built in many models and sizes. We shall be glad to send catalog giving full details. Better yet, send us parts or prints with a description of your measuring and inspection problems – we shall be pleased to help.

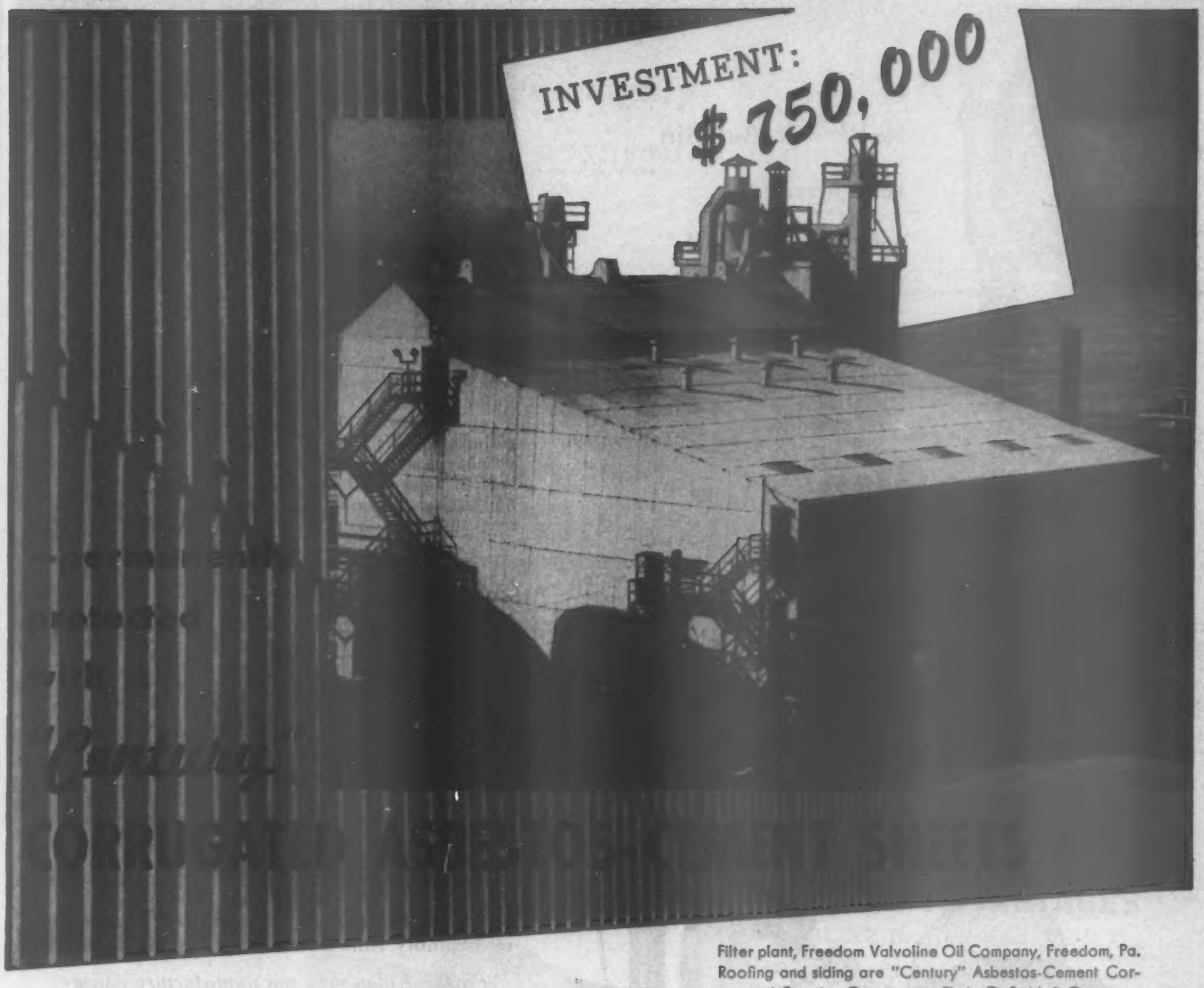
Optical Comparator Division

JONES & LAMSON

MACHINE COMPANY
Springfield, Vermont, U.S.A.

J&L

Machine Tool Craftsmen Since 1835



Filter plant, Freedom Valvoline Oil Company, Freedom, Pa. Roofing and siding are "Century" Asbestos-Cement Corrugated. Erection Contractors: Elwin G. Smith & Company.

THIS modern filter plant of the Freedom Valvoline Oil Company, Freedom, Pa. is typical of the many progressive industrial plants throughout the nation where "Century" Corrugated Asbestos-Cement Sheets have been used for both roofing and siding.

The choice of "Century" Asbestos Corrugated is a logical one wherever quick application and maintenance-free service are desired. "Century" Asbestos Corrugated goes on quickly, inexpensively. The large-size sheets are exceptionally strong, but they can be cut and drilled easily—fastened in place with a minimum of labor.

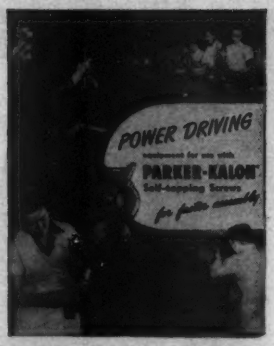
And the protection is permanent! "Century" Asbestos Corrugated resists weather; *can not burn*, rot, or rust. Rodents and termites can't hurt it. It doesn't even need protective painting to preserve it!

Whatever your building plans—new construction, modernization, expansion—get the cost-saving story of "Century" Corrugated Asbestos-Cement Sheets. We'll gladly send complete data on request.

Nature made Asbestos...
Keasbey & Mattison has made it serve mankind since 1873

KEASBEY & MATTISON
COMPANY • AMBLER • PENNSYLVANIA

NEW P-K Bulletin tells how to add more speed to the faster fastening method



Describes and illustrates the various basic types of electric, air-operated and impact tools, as well as the automatic hopper-fed machines for screw driving in common use. Helps you determine which type is best for your assemblies. Also includes useful information on proper bit and socket selection. Free on request.

POWER DRIVING

of P-K Self-tapping Screws

This automatic, double spindle, hopper-fed machine is being used for driving two P-K Type U Hardened Metallic Drive Screws simultaneously in a plastic wiring device.

To meet America's colossal production requirements . . . for defense, for civilian goods . . . even more speed is needed in operations that have already set time-saving records.

Fitting right into this urgent need for *more speed, more efficiency*—in assembly operations—is the ever-wider use of Power Driving devices with P-K Screws.

A wide range of Power Driving equipment is available for use with the various types of P-K fasteners—and with slotted, Phillips recessed, and hex head styles. And all types have this in common—a substantial reduction in assembly time and cost.

Parker-Kalon does not manufacture power-driving equipment, but has tested many devices in the P-K laboratory under production line conditions, and found them suitable for use with P-K Screws. The information contained in the "Power Driving" Bulletin is based on reports of these many tests.

For specific information on power driving applied to your assemblies, talk to a P-K Assembly Engineer. Your P-K Distributor will furnish a copy of the Power Driving Bulletin . . . ask for Form No. 401. Or write: Parker-Kalon Corporation, 200 Varick St., New York 14.

IF IT'S P-K IT'S O.K.

The Original

PARKER-KALON® SELF-TAPPING SCREWS

A TYPE AND SIZE FOR EVERY METAL AND PLASTIC ASSEMBLY

These highly experienced, thoroughly responsible distributors (one near you) stock and recommend

BOST-BRONZ®

OIL IMPREGNATED

BEARINGS

With Oil Film Always Present All Over

For heavy loads — light loads
high speeds — low speeds
static loads — shock loads

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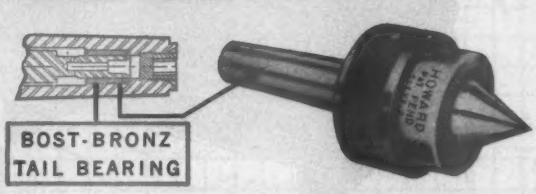
WINSTON-SALEM, NORTH CAROLINA
WORCESTER, MASSACHUSETTS

take heavy loads, for example:



this *live-center* made by Melin Tool Co., Inc. of Cleveland, has been turning thirty ton turbine shafts for 15 months. The tail bearing is BOST-BRONZ. It's still as good as new! Frictionless and solid bronze bearings were tried but none would stand up under the terrific loads involved. BOST-BRONZ standardized, stock bearings proved the answer to years of searching for the right bearing.

STOCKED in a wide range of sizes in 6 types — cylindrical bearings, flange bearings, thrust bearings, cored bars, solid bars and plate stock.

FIVE GREAT ADVANTAGES

BOST-BRONZ Bearings are

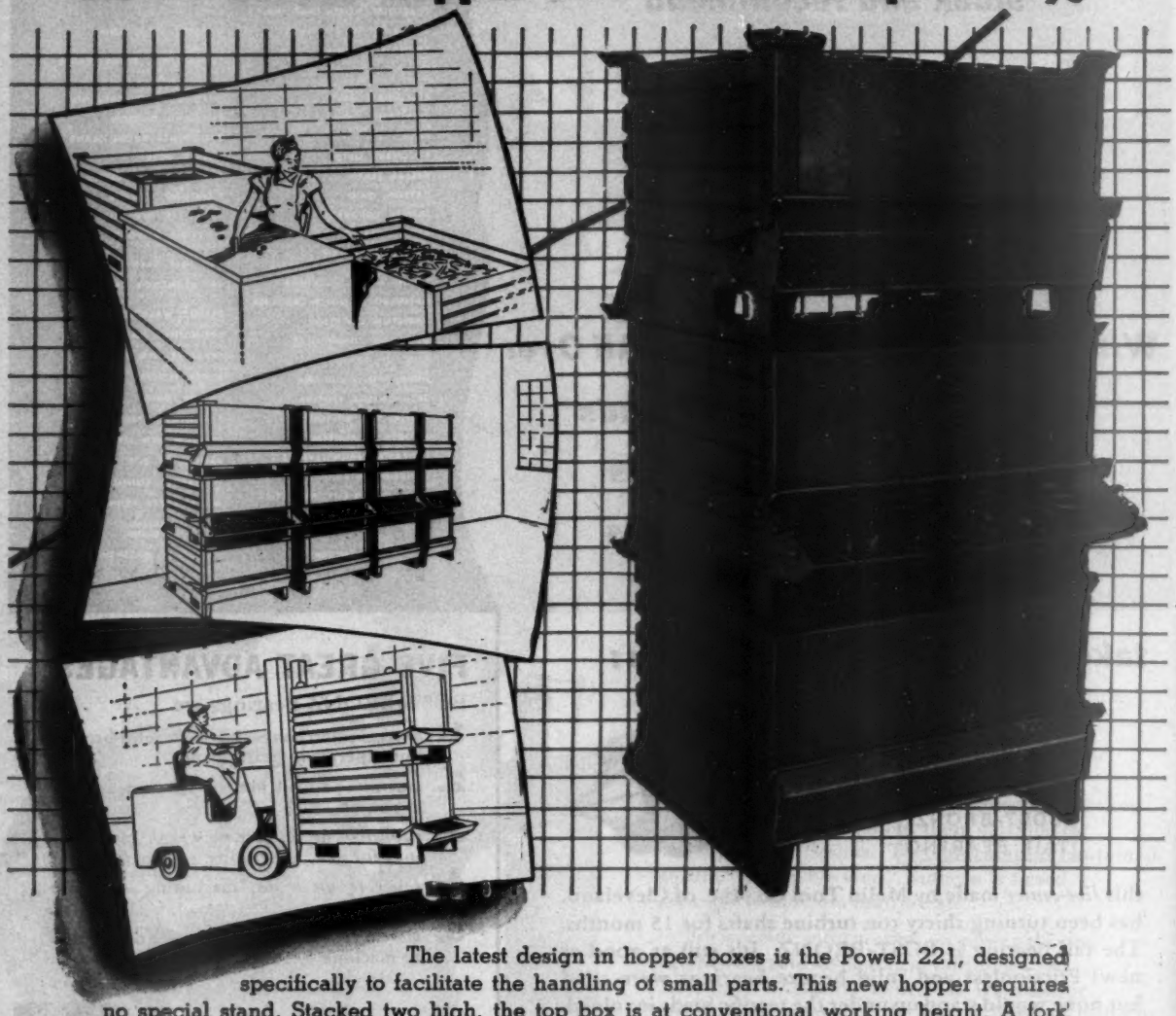
1. *better*—interchangeable with solid bronze but superior in performance.
2. *quieter* — an oil film to start on as well as run on.
3. *cleaner* — no oil drip or waste. No openings for grit, lint or dirt.
4. *easier to use* — no machining — simple press fits.
5. *more economical* — no oil holes or grooves to machine — longer service.

GET THIS CATALOG

Write for Catalog 53. It contains a wealth of useful data and selection charts.
BOSTON GEAR WORKS
63 HAYWARD ST., QUINCY 71, MASS.

HANDLING SMALL PARTS?

New POWELL Hopper Box Will Save up to 40%



The latest design in hopper boxes is the Powell 221, designed specifically to facilitate the handling of small parts. This new hopper requires no special stand. Stacked two high, the top box is at conventional working height. A fork lift can switch boxes in a matter of seconds. A three-stage, no-jam door opening permits worker utmost flexibility — can be left open for quick inventory checks. Funnel type stacking lugs means quick, safe spotting by truck operator. Hopper is available in two-way or four-way entry, straight or slanted gravity feed bottom.

The Powell 221 can be modified or new designs can be constructed to fill your specific job application — built to size and load capacity of your job requirements. For further data check your Powell representative or write direct.

Send Inquiries to Dept. 1111

POWELL PRESSED STEEL CO., HUBBARD, OHIO

ORIGINATORS OF COLD FORMED ALL STEEL HANDLING EQUIPMENT

(In Greater Youngstown)

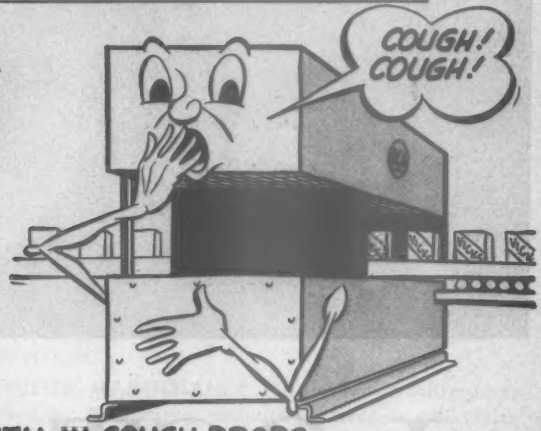
POWELL PRESSED STEEL

SINCE 1920

ERIEZ MAGNETIC ATTRACTIONS

ERIEZ MANUFACTURING CO., ERIE, PA., U.S.A. • PRODUCERS OF MAGNETIC SEPARATORS AND SELLERS OF (RCA) ELECTRONIC METAL DETECTORS

A LIVE 50 MM. SHELL ABOUT TO GO INTO A PROCESSING PLANT'S HAMMERMILL WAS CAUGHT BY AN *ERIEZ* PLATE-TYPE **ATOM**AGNET. ALTHOUGH THE SHELL WAS 90% BRASS THE MAGNET GRABBED AN IMBEDDED STEEL RIM AND SAVED THE DAY. *ERIEZ* NEW PLATE **ATOM**AGNETS ARE THE MOST POWERFUL EVER BUILT..... CAN BE INSTALLED IN SPOUTS, CHUTES OR SUSPENDED OVER MOVING BELT CONVEYORS. THEY ARE VITAL TO THE PROTECTION OF IRREPLACEABLE EQUIPMENT.



METAL IN COUGH DROPS CERTAINLY STOPS NO THROAT TICKLE. IT'S BAD AND HAS TO BE GUARDED AGAINST. *THE VICK CHEMICAL COMPANY* ASSURES ITS PRODUCT PURITY BY USING AN *R.C.A.* METAL DETECTOR, SOLD BY *ERIEZ*... MANY SIZES TO CHOOSE FROM. THIS INSTRUMENT PUTS UP AN ELECTRONIC BARRIER AGAINST *ANY METAL!*

IT'S STRICTLY APPLESAUCE!.... (NO TRAMP METAL IN IT). *AMERICAN HOME FOODS COMPANY* INSTALLED AN *ERIEZ* 3" MAGNETIC TRAP IN ITS APPLESAUCE LINE AND SAVED **$6,300** IN REPAIRS AND DOWNTIME IN **9** WEEKS!

JUST OFF THE PRESS! GENERAL CATALOG #15, WRITE NOW!

ERIEZ MANUFACTURING COMPANY
209 STATE STREET, ERIE, PA.

MY CONTAMINATION OR SEPARATION PROBLEM IS:

PLEASE SEND LITERATURE ☐ CATALOG #15 ☐
HAVE REPRESENTATIVE CALL ☐ PROMPTLY ☐ WHEN IN AREA

NAME
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51K

LOST:

110,000,000 Man Hours Annually due to Industrial Eye Accidents

YOU CAN PREVENT THIS TRAGIC WASTE IN YOUR PLANT WITH GOGGLES COSTING $2.30

Eye accidents cost industry per year about 110,000,000 man hours or about $160,000,000 apart from compensation, medical, idle machine charges and other costs. Yet the safety goggles that *prevent* 98% of eye accidents average $2.30 in cost or only 78 cents more than the loss of just *one man hour* of productive time. (Current average hourly earnings of factory workers $1.52.)

In these days of capacity production and short supply of skilled workers, an AO Eye Protection Program deserves your serious consideration — *more than ever.* Particularly when it can pay for itself within six months time in the production it protects and the costs it can save. Ask your nearest AO Safety Representative to show you how.

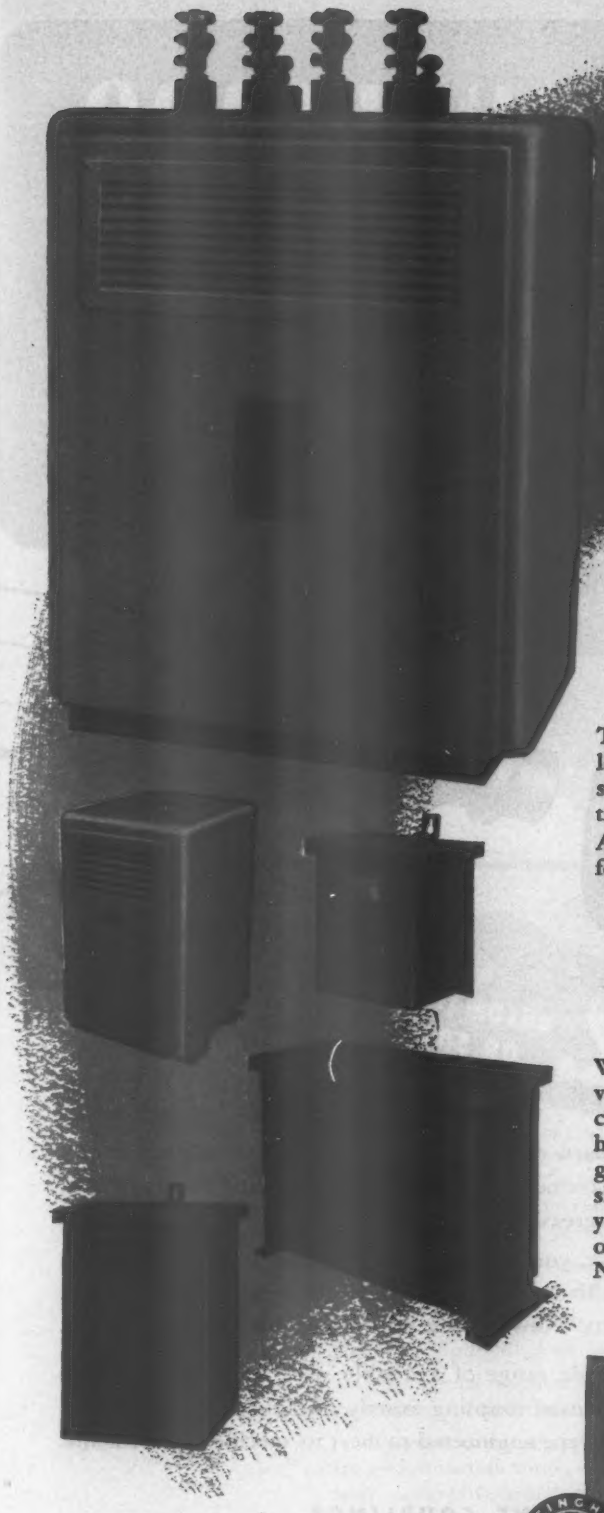
FACTS TO REMEMBER:

Industrial eye injuries cost over $5 per employed worker per year — with compensation averaging $328 per injured man even in the low-cost year of 1938.

American Optical

SAFETY PRODUCTS DIVISION

SOUTHBRIDGE, MASSACHUSETTS • BRANCHES IN PRINCIPAL CITIES



MORE KVA PER POUND!

Lightweight, dry-type transformers save space, cut installation costs. 3 through 167 kva, single phase, or 9 through 225 kva, three phase.

They're lighter and smaller! Compact, completely ventilated coils on Hipersil® cores—neatly enclosed in sheet steel cases for convenience of mounting, cleanliness, trim appearance.

Add all this to the savings inherent in dry-type transformer design:

NO VAULTS. Mount them on the floor, walls, posts or overhead platforms, close to the load they serve. They're safe.

SIMPLIFIED MAINTENANCE. No liquids to store, filter or replace. No gauges, radiators, valves or gaskets to get out of order.

Westinghouse Dry-Type Transformers are available for voltage step-down or step-up applications or for phase changing. Types AJRB and AVRB (3 through 100 kva) have circuit breakers built into the high-voltage circuit, giving 3-way protection against damaging overloads or short circuits, cutting installation time up to 50%. Ask your Westinghouse representative for a copy of B-4428, or write Westinghouse Electric Corporation, P. O. Box No. 868, Pittsburgh 30, Pennsylvania. J-70607

YOU CAN BE SURE... IF IT'S Westinghouse

DRY-TYPE TRANSFORMERS

HANSEN COUPLINGS

GIVE YOU 2 *Big Advantages*

WRITE FOR CATALOG

QUICK-CONNECTIVE COUPLINGS for AIR ACETYLENE • OIL • GREASES • GASES VACUUM • STEAM • OXYGEN • HYDRAULIC

REPRESENTATIVES

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Export Department: CLEVELAND

With Hansen couplings you save precious minutes every time you connect or disconnect a fluid line carrying gas, liquid or grease.

To connect, you merely push plug into socket—flow starts instantly. To disconnect, pull back sleeve on socket, coupling disconnects. Flow is shut off instantly and automatically.

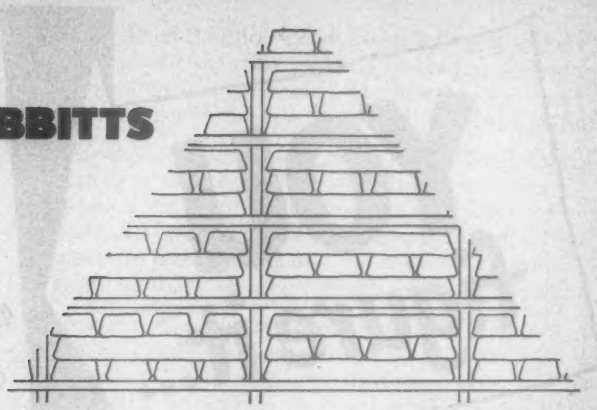
From a wide range of available sizes and types, you can select a Hansen coupling exactly suitable for your application—each type engineered to meet its specific requirements.

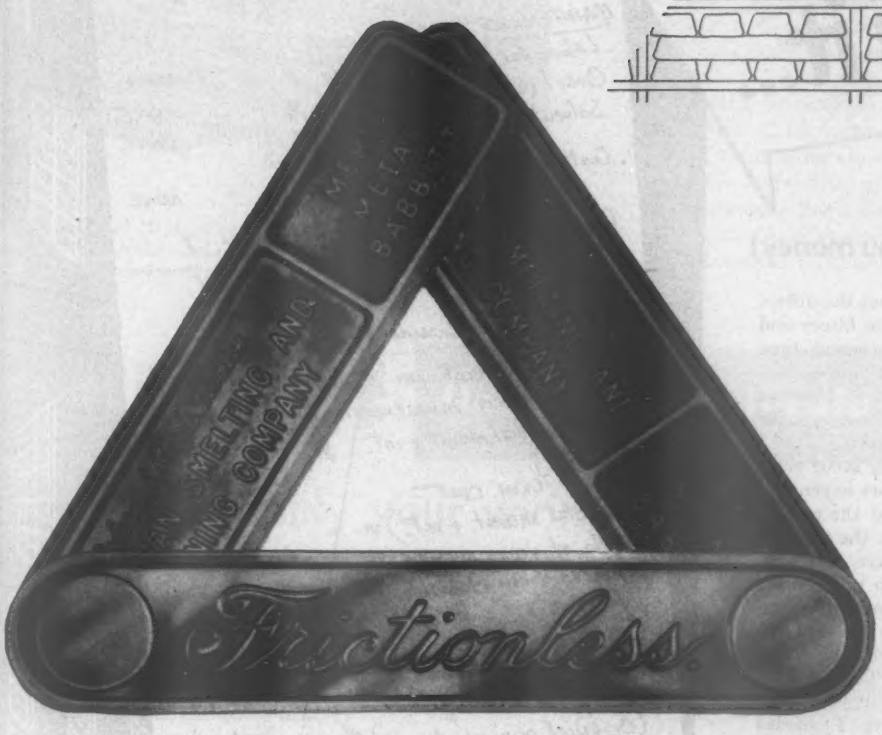
QUICK CONNECTIVE FLUID LINE COUPLINGS...

THE HANSEN MANUFACTURING COMPANY

4031 WEST 150th STREET • CLEVELAND 11, OHIO

FEDERATED'S "BIG 3" BABBITTS





for 90% of all maintenance bearing work

Federated's "Big 3" now includes the famous Frictionless® Bearing Metal. With XXXX Nickel® for heaviest loads and extreme speeds, and Merit Metal, "the Universal Babbitt," for moderate loads and moderate speeds, Frictionless is the low-cost item for a wide variety of services in which it has proved its reliability for many years.

Frictionless will continue to be manufactured to exactly the same formula which has made it one of the country's most popular babbitts.

With Federated's "Big 3" bearing metals in your stockroom you can pour the right bearing to fill practically any machinery or equipment maintenance requirement.

For special applications Federated will continue to produce bearing alloys to customers' specifications.

For most customers' maintenance requirements Federated recommends the "Big 3". It's a combination which will hold down stockroom items . . . minimize the risk of shortages . . . simplify inventory control and purchasing.

Federated Metals Division

AMERICAN SMELTING AND REFINING COMPANY • 120 BROADWAY, NEW YORK 5, N. Y.

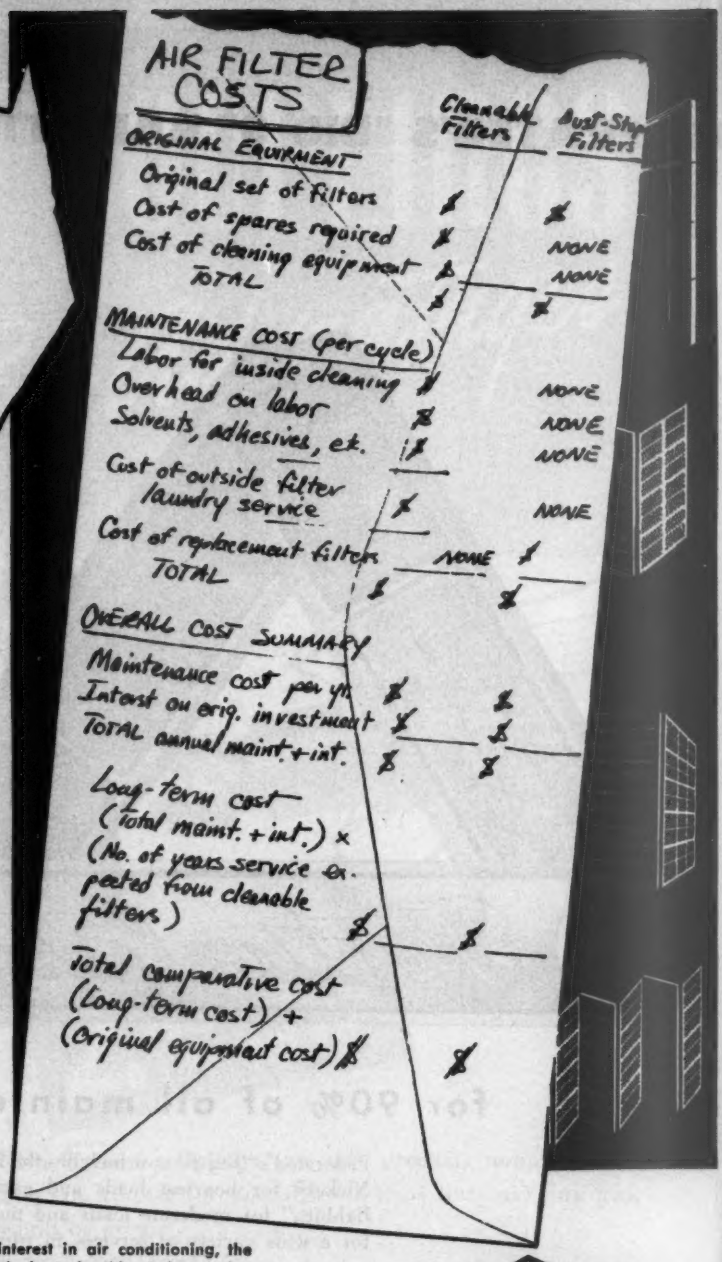
YOU figure it...

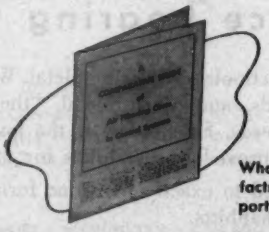
(4 to 1, we'll save you money)

Have you, *yourself*, figured out the difference in cost between cleanable filters and Fiberglas Dust-Stop* replacement-type filters? Using your *own* cost figures, follow the method shown above. Chances are about 4 to 1 that you'll save with Fiberglas Dust-Stop Air Filters.

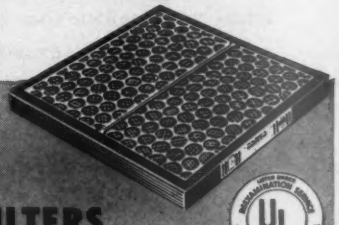
Why? Because while rising labor costs have made filter cleaning more expensive, mass production has lowered the cost of Dust-Stop filters. In fact, on the basis of one 40c cleaning every 90 days, cleanable filters would have to last up to 14 years to match the cost of Dust-Stop Filters replaced at the same intervals . . . and you get a *new* filter with each change.

Check the facts: The "Comparative Study" shown below will help you. Send for it today. Owens-Corning Fiberglas Corp., Dept. 85-K, Toledo 1, Ohio.

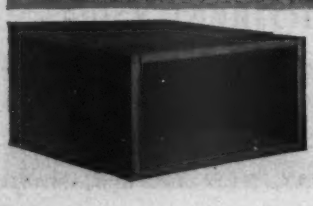




Whatever your interest in air conditioning, the facts, figures and charts in this study are important to you. Write for your free copy today.



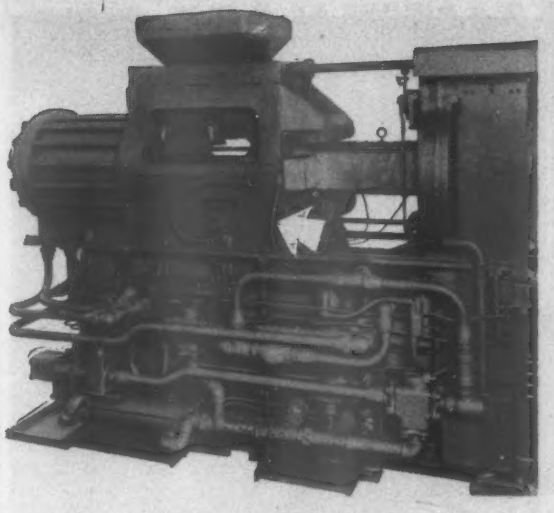
OWENS-CORNING FIBERGLAS DUST STOP* AIR FILTERS



FIBERGLAS INSULATION FOR AIR DUCTS

Ageless, light in weight, firesafe, moisture resistant, Fiberglas Duct Insulations can be quickly applied . . . have very high acoustical value . . . won't erode at 6,000 fpm . . . cost less than other insulations approaching them in thermal efficiency. Write for details.

*DUST-STOP is the trade-mark of Owens-Corning Fiberglas Corporation for impingement-type air filters made of glass fibers. FIBERGLAS is the trade-mark (Reg. U. S. Pat. Off.) of Owens-Corning Fiberglas Corporation for a variety of products made of or with fibers of glass.



In this Model 10 H-32 oz. Reed-Prentice plastic injection molding machine, Sealtite protects the heating chamber control wiring.

THE Reed-Prentice Corp., world's largest makers of plastic injection molding machines, solves numerous wiring-protection problems on its equipment with flexible Sealtite* Electrical Conduit.

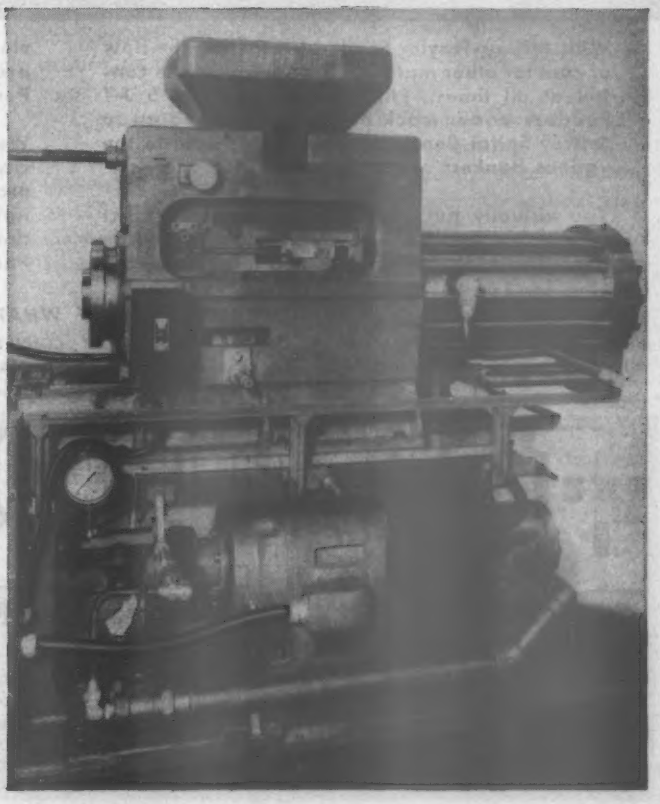
Where connections are cramped or bends are short, Sealtite is far easier to install. Where movement is called for, Sealtite permits it; where vibration exists, Sealtite absorbs it. Sealtite's liquid-tight, synthetic jacket resists oils, most chemicals, and gases. Its tough steel core stands up under impact.

Sealtite's adaptability on machines like these is only one example of its usefulness. It's equally versatile in chemical plants, food processing industries, for making cramped conduit installations anywhere . . . for permanent or temporary wiring installations. Your electrical supply house carries Sealtite—and will be glad to tell you more about it. The American Brass Company, American Metal Hose Branch, Waterbury 20, Connecticut. In Canada: The Canadian Fairbanks-Morse Company, Ltd.

*Trademark

Let SEALTITE flexible and liquid-tight conduit simplify your wiring

Reed-Prentice Model 10 E-16 oz. plastic injection molding machine showing plunger end. The horizontal Sealtite Conduit carries wiring to 30-hp motor. The vertical Sealtite Conduit carries control leads to synchronous timer.



for **flexible, liquid-tight** electrical conduit . . .

specify **SEALTITE**

AN ANACONDA® PRODUCT

CONTROL YOUR FEED

BUILD UP YOUR PROFITS . . . THIN OUT YOUR LOSSES

With Jeffrey-Traylor Feeders on the job the flow of coal (or other material) is under absolute control at all times. Photo shows two No. 5 J-T Feeders under track hoppers and feeding to Jeffrey Spiral Conveyor which takes coal to the various bunkers ready for use.

You virtually put your power plant on a strict diet . . . the feeders regulating the amount to be fed, exactly . . . just set 'em and forget 'em. J-T electric-vibrating Feeders are practically foolproof . . . nothing to wear out or lubricate. Power consumption is unusually low.

We build a type and size Feeder (desired capacity) to take care of your feeding requirements properly — tubular or pan decks, single or multiple power units. We also apply electric vibration to Conveyors, Screens, Dryers, Coolers and Packers. To be sure — better buy Jeffrey.

PARTIAL LIST OF WHAT WE MAKE

BIN VALVES • BUCKET ELEVATORS • CHAINS • COOLERS • CONVEYORS • CRUSHERS • DRYERS • IDLERS (BELT) • FEEDERS
PULVERIZERS • WEIGH FEEDERS • PACKERS • SCREENS • CAR PULLERS • SPROCKETS • TRANSMISSION MACHINERY

Literature On Request

THE JEFFREY MANUFACTURING COMPANY

ESTABLISHED 1877

911 North Fourth St., Columbus 16, Ohio

Complete Line of Material Handling, Processing and Mining Equipment

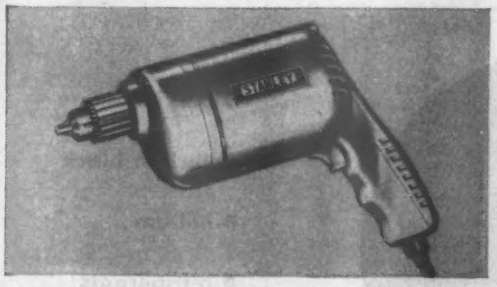
GET MAINTENANCE WORK DONE IN MINIMUM TIME

with the **STANLEY ELECTRIC HAMMER No. 310-A**

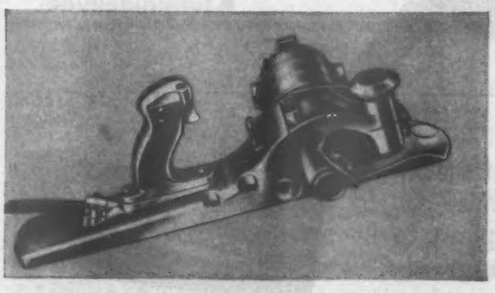
More blows per second! This important advantage of the Stanley 310-A Electric Hammer means speedier drilling and chipping of stone, concrete, brick; chiseling wood; scaling rust; vibrating forms; etc.

At the same time, operators find the 310-A less tiring. Ingenious design features the "free-thrown" plunger (exclusive with Stanley) . . . no direct connection between motor mechanism and plunger. It hammers without the need for pressure on the handle. *Result:* there's no kick-back, less vibration, and virtually no chance of breakdown.

The 310-A is completely self-contained. Does not require such auxiliary equipment as air pump, control box, or converter. Weight is only 13 lbs. Packs in handy steel carrying case. Operates on either A.C. or D.C. lighting circuits. Powerful motor and heavy-duty seal-type ball bearings assure long life. Capacity 1⅛" diameter hole. See the 310-A at your dealer's, or write for detailed literature. Stanley Electric Tools, 506 Myrtle Street, New Britain, Connecticut.



No. 166 Drill. A powerful, high-speed ½" hand drill for drilling steel or wood. Sealed-type ball bearings. Universal motor. Weight 5 lbs. Length 8" along chuck line.



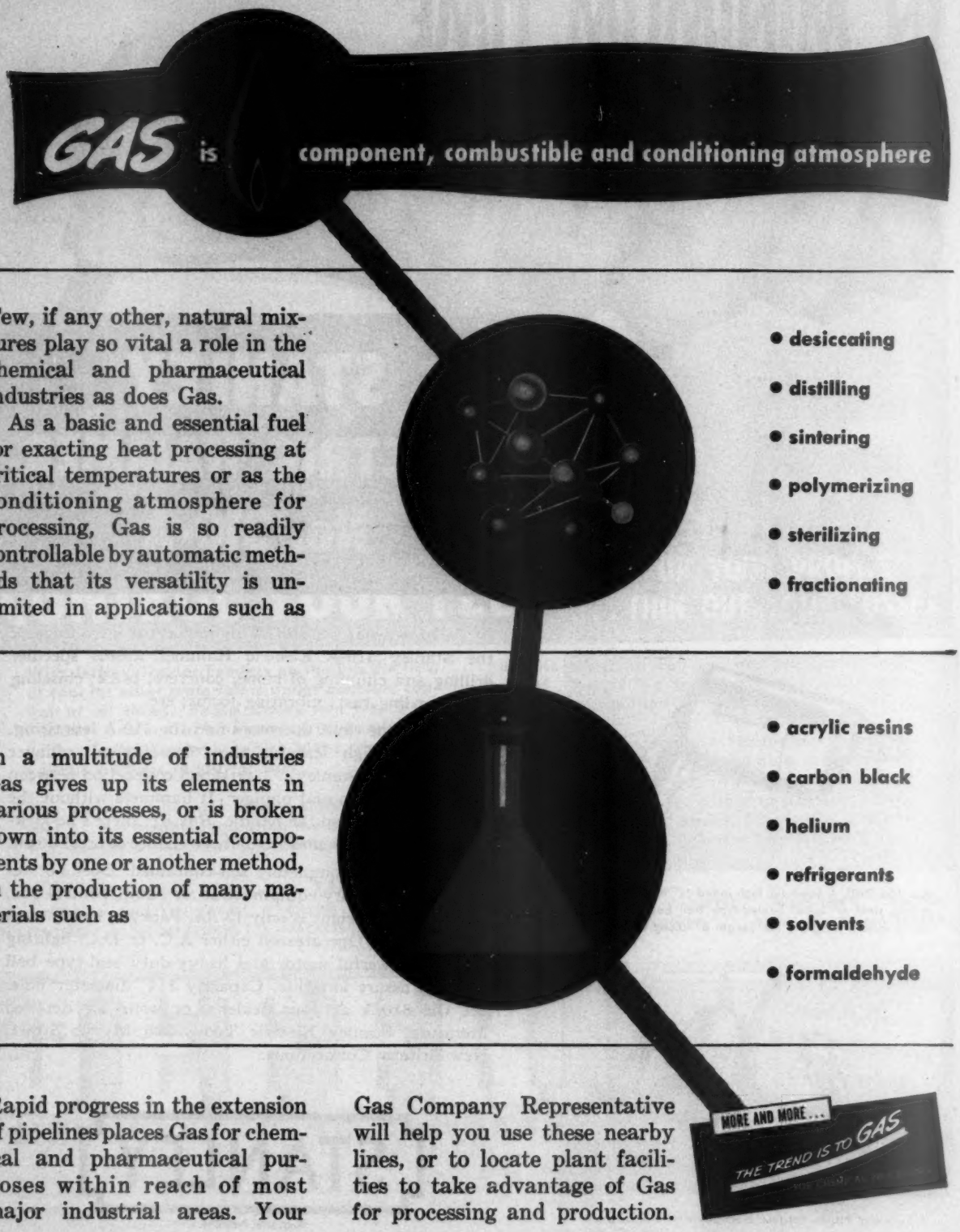
J-5 Power Plane. Largest, most powerful electric plane on the market. Planes all wood surfaces up to 2½" wide. Speed 18,000 r.p.m. 1 h.p. motor.

STANLEY

Reg. U.S. Pat. Off.

HARDWARE • TOOLS • ELECTRIC TOOLS • STEEL STRAPPING • STEEL

in chemicals and pharmaceuticals



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FACTORY
MANAGEMENT and MAINTENANCE
WHAT YOU NEED TO KNOW FROM WASHINGTON ★ WHAT YOU NEE
Mobilization Communique No. 16

NPA Cracks Down on CMP Abuses—Lightly

CMP OFFICIALS are bearing down on cancellation of non-authorized orders (duplicate orders or those not otherwise covered by current CMP allotments of steel, copper, and aluminum). They see in this action the key to the stubborn problem of overcrowded order boards.

They are betting that the present "over-supply of orders"—which critics claim is over-allotment—is exactly equal to the amount of unauthorized orders remaining in circulation.

CMP officials are willing to talk tough to back up this hunch. Whether they are willing to follow up tough talk with tough compliance action remains to be seen.

There has been tough talk in the past—perhaps not so blunt, but the kind that called for follow-through. NPA has temporized, instead.

The most recent example was the "death sentence" on orders placed for third-quarter delivery. NPA directed the mills to cancel all orders based on third-quarter allotments which could not be delivered by Oct. 7.

The idea was to wipe out all the unauthorized orders. NPA admitted it would strap some companies that had honestly not been able to get delivery, but said it was necessary to clear the mill order boards to prevent the jam of paper from getting worse in the fourth quarter.

No one at NPA was surprised when the death sentence caused a howl of protest. The result was more temporizing by NPA: The effective date of the order was delayed until Oct. 31.

But NPA combined this action with another roundhouse swing at the problem, as important in its way as the cut-off orders—if it's followed up. It told all *users* of controlled materials to cancel all orders which do not properly qualify as Authorized Controlled Materials Orders—and do it by Oct. 31.

Actually, this doesn't change the rules at all. The basic rules of CMP (FACTORY, May 1951, page W-1) spell out very clearly that orders may be placed only when within the limits of an allotment for a given quarter. Duplicate orders (two or more orders based on the same allotment, with the intention of cancelling when the first is delivered) are specifically forbidden.

But the rules were widely disregarded. So, back in August, NPA warned users to cancel, threatened compliance checks (FACTORY, September 1951, page W-1). When this didn't work either, NPA ordered cancellation by Oct. 7. Then it set Oct. 31.

Officials swear they mean it this time. They say no excuses will be accepted, and no further delays granted. To back up the threat, NPA sent a letter to every manufacturer who has filed a CMP-4-B application for allotment. The letter promised criminal prosecution of any manufacturer who failed to cancel by Oct. 31.

None of these actions give any relief to the manufacturer who placed only proper Authorized Controlled Materials orders and was unable to get delivery. If you're in this boat, you have just one hope for relief:

You'll have to show NPA that your inventories are used up, and that you are actually at the stage when you will have to lay off workers. If you can do that, it's worth while pushing an application for exception to the new Oct. 31 cut-off date. Otherwise, you're wasting your time.

NPA has been extremely tough on appeals. Out of a couple of dozen that reached top CMP levels for a decision, only one has been granted.

Actually, CMP officials are surprised at the small number of appeals. Their explanation: A lot of companies don't want to invite a close examination of their inventory position.

COPPER: The Tightest Spot of All

TOP MOBILIZERS call copper "the shortage without a solution."

DPA Administrator Manly Fleischmann sees only one answer—*design it out of products.* He's not talking about the short term, either.

Mobilization simply makes more demand on copper than known deposits can produce. Even a high rate of business activity after mobilization tapers off would maintain the pinch. Trouble is, supply remains fairly static, while demand keeps climbing.

The following figures tell the supply story. They are the copper supply figures top mobilizers use in making their plans:

1. U.S. production and imports, just prior to the outbreak of the Korean war, were running at an annual rate of 2,070,000 tons.

2. U.S. production has gained a little, but imports have dropped a lot, so this year only 1,840,000 tons are expected.

3. By July 1953, the supply is expected to be

2,091,000. That's just 21,000 tons more than the pre-Korean figure—the net gain expected after three years of effort to increase production.

The 1953 supply is expected to be about 15% less than demand. Even this dismal forecast is based on an expected drop in defense demands.

Those are the facts that Fleischmann has in mind when he advises industry to design away from copper. A lot of big copper users are taking him seriously, though many hesitate to take the final steps—such as redesigning products, new machinery, new production methods.

But some electrical equipment manufacturers have already taken action:

One manufacturer of heavy electrical equipment for factories figures he can cut out 40% of the copper, replacing it with aluminum. Another manufacturer is putting aluminum bus duct into production. Motors are now being wound with aluminum wire.

When the industry that leans more heavily on copper than any other is moving toward aluminum as a substitute, it's a good sign that others may have to follow.

When and How You Get a DX

CHANCES ARE you've heard a lot of talk about the DX "superpriority" for bottleneck busting. But you probably haven't seen one—and you may not for a long time. Here's why:

The DX is strictly an emergency weapon. Besides being extendable (a priority that can be passed along from one person to another), it also has the advantage of involving less paper work for both the government and the businessman than a series of directives. *It is used only for "B" products,* as designated in Controlled Materials Plan rules. And it's used largely at the warehouse level, since it's for urgently needed items. It corresponds to the triple-A rating of WPB days.

NPA's priorities staff keeps pretty tight control of the DX. They won't issue one except in cases where an extendable rating is the only fair approach.

For example: If NPA has to take one warehouse's entire supply of fractional horsepower motors for an urgent military program, it'll use a DX so the warehouser can get more motors to meet his regular demands.

Of course, the items involved may, and probably do, include CMP metals. But it wouldn't do any good to give a super-rating to a valve producer for steel if it would take him a month to produce valves needed immediately. The *producer* who has been cleaned out by a DX order can apply to NPA for more metal, either in the current quarter or in his next allotment.

You don't fill out any forms to get a DX. If you are having difficulty finding a component of some sort and it's holding up scheduled production in your plant, write or telephone your claimant agency. Usually this will be an NPA industry division.

If the bottleneck item is holding up an order from the Armed Forces or the Atomic Energy Commission, you should contact the contracting agency. If it's the military, go to the nearest Army, Navy or Air Force field office. If you're just a sub-contractor, tell the prime contractor your trouble and ask him to contact the contracting agency.

But you don't have to be working on a military or AEC order to get a DX. If a shortage of any "B" product is stopping your production, you can call on NPA for help. If you're making earth-moving equipment, for example, contact the construction machinery division. **Your point of contact is the claimant agency that gives you your CMP allotment—not the agency responsible for production of the type of component you need.**

Chances are you won't get a DX, or even a directive. In the majority of cases that have come to NPA so far, the agency has been able to get most of the items requested by asking the suppliers involved to divert some of their production.

In fact, the DX has had little use so far. The military and the AEC have the right to use it at any time, merely reporting to NPA afterwards. Actually, however, they have lived up to their agreement to clear all uses of DX with NPA's priorities and directives division in advance. They'll continue to do so except in case of an emergency of major proportions.

Trouble Ahead in Components

KEEP AN EYE on the flow of components into your plant. Shortages are going to cause increased production troubles next year.

Stories of military goods finished except for a component are already haunting the mobilizers. They are likely to become common in all types of manufacturing industries from now on.

Planners made an error in the fourth-quarter allocation of raw materials to NPA's Components Division. They cut the division sharply, especially in copper. For the first quarter of next year, amounts have been restored to the old level, but

the damage to production has already been done and can't be made up.

Evidence of specific shortages is piling up at NPA. Here are some examples:

Specialty transformer makers say their fourth-quarter allotment of materials was enough for only half of their defense-rated orders. Delivery time for some transformers is now a year, compared to two months before the Korean fighting.

A user of 40- and 50-hp. motors told NPA he couldn't get delivery for 50 weeks.

Power-transmission chain orders take four to 12 months, depending on type, compared to a month a year ago.

A different indication of the seriousness of the situation is this: The Atomic Energy Commission alone would take almost the entire output of heat exchangers and certain types of valves — if it weren't for other pressing military needs.

All of these are reasons for the elevation of William C. Truppner, top man in the CMP brain trust, to Assistant Administrator of DPA. The move puts him among the high policy makers. His most important assignment in the new job will be to keep components flowing.

So right now is a good time to remember the old adage about the squeaking door that gets the oil. If you're having trouble with components, let NPA know about it. Maybe they can't help. But they can't even try unless you let 'em know where you stand.

Don't expect this move to end the shortages, however. They are something industry is going to have to live with until military demand tapers off.

WBS's Pattern for Handling Disputes

STRIKES ARE HURTING the defense program—badly, in at least two key areas. Those areas are military aircraft and copper-and-brass.

Aircraft strikes have been serious enough to cut back substantially on engine production that was already nearly 30% behind schedule.

Copper strikes have made it necessary to put the bite on the stockpile twice—for a total of 55,000 tons of copper that was supposed to be hoarded for use only "in the direst national emergency."

On paper, the copper was merely "loaned." It must be replaced by the users—25,000 tons by next July 1; the balance in the "indefinite future." But to replace strike-lost copper to the stockpile will mean cutting back production somewhere along the line.

Adding it all up, the mobilizers and the military are worried about the strike impact. We've even heard some of the top brass at the Pentagon talk about demanding "new legislation to handle labor disputes."

Don't put any stock in talk about new disputes legislation. Unless the situation gets much worse, the Pentagon won't ask for it. And even if the Pentagon asks, Congress won't give.

The reason: We already have established machinery for handling disputes—through the Wage Stabilization Board. WSB hasn't proved yet that it can cope with the situation. *But it hasn't shown that it can't, either.*

Most criticism of WSB's strike-handling stems from administrative foot-dragging in referral of strikes to the Board. WSB can't act until the President certifies the strike to the Board.

Actually, WSB's record to date is pretty good: Six referrals, one settlement, three cases of "resumed production," one failure, and one case "hanging fire."

Here's the detailed box-score on WSB's strike-handling up to Oct. 25:

American Smelting & Refining. On WSB recommendation, CIO Steel Workers settled for 8 cents an hour (within the cost-of-living formula) plus about 10 cents an hour "to adjust intra-plant inequities."

Wright Aeronautical Corp. United Auto Workers' 10,000 members went back to work after 4-week strike when case went to WSB. An outside panel appointed by the Board is now studying UAW demands for GM-type contract with escalator, annual improvement factor, welfare plans, etc.

Douglas Aircraft. UAW pulled about 10,000 members at four Douglas plants on Sept. 4. They went back to work in mid-October when the case went to WSB. Outside panel is studying demands similar to those made at Wright.

Brass fabricators. UAW threatened a strike against 13 brass mills, but it never came off. Dispute was certified to WSB before deadline. It's in the hands of a panel.

Borg-Warner. UAW pulled 7000 members on Oct. 10. They have refused to resume work on the basis that only 15% of plant's output is for defense. Reuther of UAW says union is willing to resume work on defense items. WSB refuses to get into the case because its policy is not to handle a dispute while work is stopped. And it insists on 100% work resumption.

Copper mines. The left-wing Mine, Mill, & Smelter Workers shut down the nation's copper

mines, refused to go back to work at WSB request. The Board bucked this one back to the President for a Taft-Hartley injunction. That got the men back. The injunction is still in effect. This is the Board's only real "failure" to date — and other established machinery has restored production.

One other strike has come to WSB—but not by Presidential certification. It's one of the rash of "little" strikes that has been snarling construction on atomic energy projects. This one came to WSB by voluntary action of the union and the AEC contractor. It has been referred to the Construction Industry Stabilization Commission for recommendations. Both sides have agreed to accept a WSB decision as final and binding.

It's too early to be certain, but the pattern of disputes handling in defense strikes seems to be this: If defense production is critically affected by a strike or threat of a strike, the President will refer the dispute to WSB. The Board will ask for resumption of production. If—and only if—the strikers go back, WSB will hear the issues and make recommendations. If the strike does not end, WSB will refer the case back to the White House for a possible Taft-Hartley injunction.

What's Happening to Salary Stabilization?

THIS IS A BIG QUESTION in the minds of plant operating executives. Two reasons:

1. Slow handling of requests for approval of doubtful policies or practices has complicated salary administration in some companies.

2. What the Salary Stabilization Board sets as policy, especially if it's tighter as time goes on, can affect executives' own earnings.

Salary stabilization people aren't "covering up" on complaints about slow processing of requests. They readily admit it's been a big problem to get fast action. One big reason: budget troubles. The Office of Salary Stabilization, responsible for acting on all requests for rulings, doesn't have funds for regional offices.

On the policy side (the responsibility of the Salary Stabilization Board), you can look for a rash of activity soon—after what seemed like a long hibernation. Some new regulations may be out by the time you read this.

To SSB members, the long pause since the first three regulations hasn't been "hibernation" at all. They've had to do a lot of pioneering work. Just copying Wage Stabilization Board regulations wouldn't do the job that needed doing, they felt. Tailor-made policy, with emphasis on individual bargaining, is needed for salaried people—not the mass emphasis of WSB's approach.

The first big action by SSB is pretty sure to be of little more than academic interest to plant operating executives. That's the regulation on pay for commission salesmen. Another problem that has been worked on hard, and should be settled soon, is the question of rules for athletes and performers in entertainment fields.

Rules on stock option plans hit somewhat closer to home for plant men. The problem is complicated by Internal Revenue rules on what's compensation and what isn't. These have to be considered, to keep from squeezing employers between two sets of regulations that don't mesh.

Skeptics consider this one mostly for show, affecting "big brass" in industry mostly. But stabilization planners rightly spot the bad psychology of not doing something about it.

Revision of present SSB Regulation 3 is also in the wind—covering merit, length of service, and promotional increases. Look for the revised regulation to be streamlined, clearer, giving more positive guidance to make it easier to self-administer.

The question of foremen's salaries also poses policy problems. The traditional headache is to keep pay differentials between the foremen and the people working under them. Look for clarification from SSB on this one, too.

A CHANGE IN THE WAGE RULES

Everybody's having trouble keeping up with all the orders and amendments being issued in Washington. FACTORY's no exception.

Between the time our September, 1951, issue went to press and the time it appeared, WSB crossed us up by amending wage regulation GWR 5. (We couldn't report this to you in October because our regular report was dropped to make room for an article by C. E. Wilson.)

The change involved granting merit or length-of-service increases to employees in companies using a "random rate" of payment (no established job classification scheme, with definite pay ranges).

The original regulation required prior WSB approval of individual cases.

You can now give merit and l-o-s increases without prior WSB approval under these conditions:

1. Total of all such increases may not exceed the corresponding percentage in 1950, or 6%, whichever is higher.

2. No individual may get more than 10%.

3. The top-paid individual in the "random-rate group" may not get more than 5%.

4. No individual may be raised to a rate higher than the top-paid employee in the "random group."

LOOKING AHEAD IN LABOR

Last-minute round-up as we go to press

We're going out-on-a-limb: There'll be no steel strike.

Steel output can be stopped on Jan. 1 under the CIO's contract with major steel producers. We don't look for this to happen. If a wage settlement isn't reached, you can expect work to continue while the Wage Stabilization Board looks at the issues.

Government mobilizers and stabilizers will be ready with whatever is necessary to keep steel rolling from the mills. WSB wage rules are flexible, can be stretched to satisfy Philip Murray. DiSalle already is figuring the price impact of higher steel wages.

Best guess now is that steel wages will rise about 10 cents an hour. This will be based partly on cost of living, partly on productivity. Fringe benefits may cost the industry another nickel.

If agreement isn't reached, Wilson will make sure that Truman sends the dispute to WSB before a strike begins. Murray will cooperate. No Taft-Hartley injunction will be needed.

•

Pensions are not as settled as you may think—even if you have a 5-year contract. Some employers will face pressure to alter pension plans, irrespective of contract.

WSB's up-coming policy on pensions will put pension costs outside any wage formulas, let you match other pension plans. Workers under inferior plans will want changes. And employers who can't raise wages may improve pensions.

Note what General Electric did: It agreed to let CIO re-open the 5-year pension agreement twice, instead of only once.

Some pension-plan changes may be needed if a man-power plan under discussion in Washington takes hold. It would permit transfer of skilled workers to plants where skills can be used best. The problem is how to protect pension rights.

This bears watching. It could be a back-door entrance of industry-wide or area-wide pensions. Area-wide pension demands have been resisted in Toledo, San Diego, Chicago, Buffalo.

Auto Workers President Walter Reuther is competing with employers for pension and health insurance talent. UAW-CIO has advertised openings for "group insurance consultants" and "health and welfare program administrators."

As bait, Reuther promises that health insurance in UAW-CIO contracts will be "considerably expanded"; health and disability insurance will be emphasized, and labor-management boards will administer them.

•

News note: Congress has amended the Taft-Hartley act, dropping union-shop-authorization polls.

Two-fold significance: (1) Organized labor's cry of Taft-Hartley "repeal or nothing" is dead. Senator Taft will make political capital of proof he can improve the labor law with union help. (2) Unions lose the edge that polls gave them in bargaining for a union shop.

•

UAW-CIO wants a voice in sub-contracting or any transfer of production which cuts down work opportunities. Other unions will copy.

At Wright Aeronautical, one issue in a strike was a union demand for a voice in sub-contracting; also, assurance that work would come back to Wright when the government cuts back contracts.

At Nash, UAW-CIO protested layoffs which followed transfer of some operations to another plant with a better productivity record.

At Chrysler, UAW-CIO doesn't want tooling work farmed out, thus denying overtime work to Chrysler's tool and die workers.

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All about strikes . . .

• Workers who strike for an illegal union shop clause can't claim their jobs back, NLRB says in Mackay Radio & Telegraph ruling.

• CIO's Oil Workers has been unable to "sell" union's strike insurance plan to members.

• UAW-CIO's contract at Fairchild Engine & Airplane Corporation permits it to post notice of strike on plant bulletin board, arbitrator holds.

SEE PRACTICAL LABOR RELATIONS, PAGE 222.

LOOKING AHEAD IN BUSINESS

Last-minute round-up as we go to press

Good business, rising industrial production—and not too much inflation.

That's the outlook for industry through the first part of 1952—until about midsummer.

Two big industrial programs underlie this bright prospect for manufacturing industries:

Defense production—now running at the rate of $20-billion a year—is scheduled to double in the next year. So far, industry has just made a good start on the program—delivered some $14-billion of goods while Congress has appropriated about $100-billion.

Industrial expansion—the second big program—may be close to a peak now, but it still has a long way to go.

Industry now is spending at a rate well above $25-billion a year for new plants and equipment. Material shortages may drag that rate down a bit. But the program still has a year or more to run. Some of the highlights—as given in Chief Mobilizer Charles E. Wilson's latest report:

> In three years, U.S. business will invest $50-billion to $60-billion in expanding basic industries.
>
> The steel industry's expansion plans are one-third complete; 28% of new petroleum facilities are in place; the aluminum program is only 14% complete.

With defense production rising and capital expenditures running at a high level, heavy industry will be setting new records in the next nine months. The Federal Reserve Board's Index of Industrial Production, for example, may go up 5% to 8%.

•

At the same time, metalworking industries will see the greatest pinch on materials—and metal shortages will keep steady pressure under prices.

The latest Wilson report shows that industry's requests for allotments of steel, copper, and aluminum top supplies by from 45% to 70%.

As military production goes up, the pinch will get worse—and it promises to last a year. Result: There may be more slight cuts in consumer goods—cars, television, appliances. But the Administration will find it difficult to cut metal supplies sharply—in an election year. So—as it looks—there'll be a heavier squeeze on capital goods. For example: The electric power expansion program now laid out for three years may be stretched over four years.

•

What about the soft goods industries?

Textiles and apparel have been through a 6-months' period of doldrums—ever since last March. Customers have saved their money rather than rush the counters for clothing. But all the signs point to a steady, although moderate, pick-up through the Christmas season. And next year soft goods are likely to set new—if not spectacular—marks in their dollar volume of sales.

But there can be lots of competition. There'll be plenty of raw materials for most non-durable goods—in contrast to durables, where auto and television dealers now have only reasonable inventories and may well be running into shortages this winter.

Competition in the non-durables will tend to hold down prices. And some of these prices—food and clothing, particularly—are key cost-of-living items. With them fairly stable, retail prices generally promise to pick up only slowly.

In short—barring another war scare—price averages are likely to move up only slowly in early 1952.

•

So the business outlook for the next six to nine months seems fairly well set.

After that, though, it is an open question. The Russians—by ending the war in Korea or by taking a new tack in their aggressive policies—could change the whole prospect for late 1952.

Here at home, we'll have presidential elections. That would make it difficult, for example, to tighten credit controls or boost taxes again to meet new inflationary pressures.

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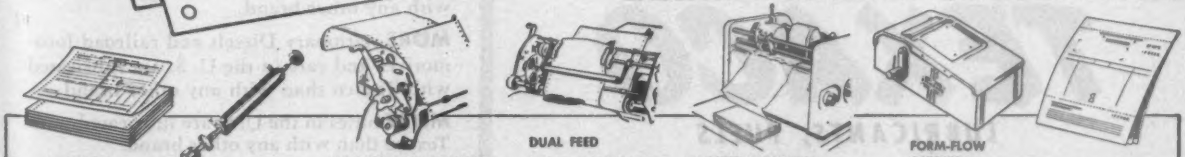


KANT-SLIP continuous forms

Feeding-aligning devices: THE REGISTRATOR PLATEN

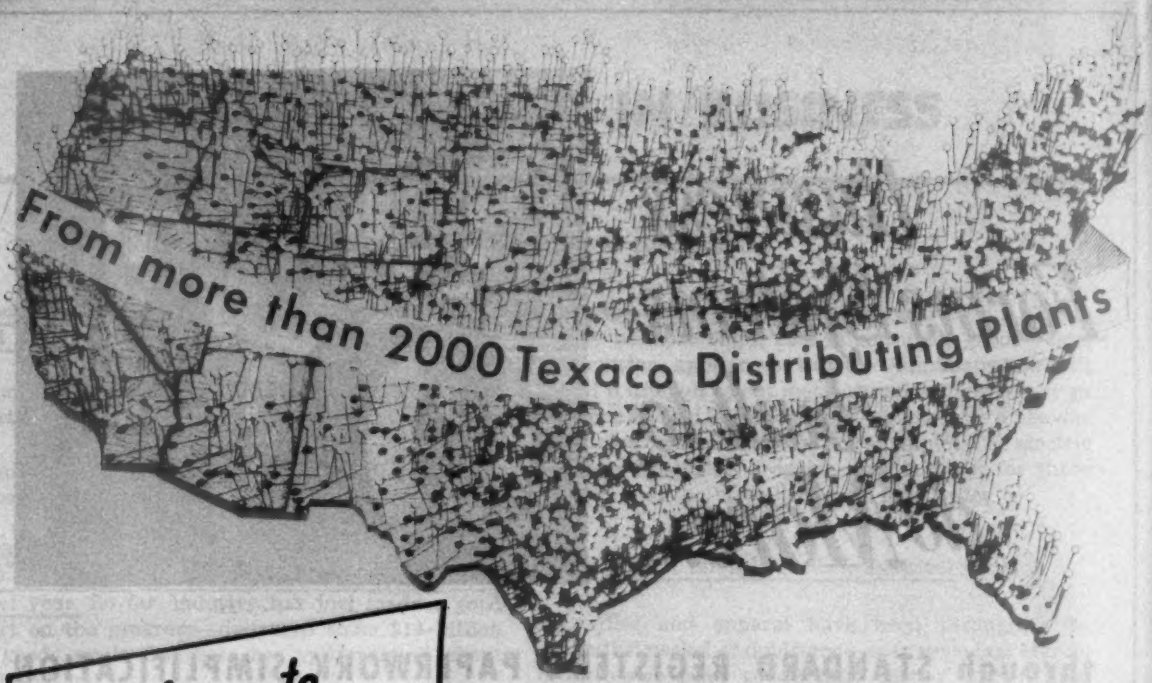
AUTOMATIC LINE FINDER Advances form into new writing position in one motion

DUAL FEED Registers 2 *different* forms for 1 continuous typing operation

BURSTER-IMPRINTERS Sign, date, number, trim, tear off, stack Kant-Slip forms

FORM-FLOW REGISTERS Better records . . . by hand

UNIT ZIPSET FORMS Carbon interleaved



Memo to Management

concerned with INCREASING PRODUCTION . . . REDUCING UNIT COSTS

Whatever you make . . . wherever your plant is located . . . Texaco Lubricants and Lubrication Engineering Service can help you make it better, faster, and at lower cost.

That Texaco combination has been delivering those benefits to industry for close to half a century.

The evidence of Texaco leadership is plentiful and convincing. A few examples, drawn from just one field, are given below.

Let Texaco help *you* establish a lubrication system designed to increase your production and reduce your unit costs. Texaco Lubricants and Lubrication Engineering Service are available in all 48 States.

Just call the nearest of the more than 2,000 Texaco Distributing Plants, or write The Texas Company, 135 East 42nd Street, New York 17, N. Y.

INDUSTRY PREFERS TEXACO
For example, just in the field of transportation —

MORE revenue airline miles in the U. S. are flown with Texaco Aircraft Engine Oil than with any other brand.

MORE stationary Diesels and railroad locomotives and cars in the U. S. are lubricated with Texaco than with any other brand.

MORE buses in the U. S. are lubricated with Texaco than with any other brand.

TEXACO

REG. T.M.

TEXACO

LUBRICANTS, FUELS
AND LUBRICATION ENGINEERING SERVICE

TUNE IN . . . TEXACO STAR THEATER starring MILTON BERLE on television every Tuesday night. See newspaper for time and station.

FACTORY MANAGEMENT AND MAINTENANCE

HARRY LEE WADDELL, EDITOR

The Wage Stabilization Board—Its Effect on Your Job

CHANCES ARE you'll never have to learn all the ins-and-outs of Wage Stabilization Board rules. Only a very few people in any company have to master all the technicalities. But you can be sure of this:

The way WSB does its job will have a lot of influence on the way you operate as a plant executive—and indirectly on your own salary level.

How can WSB affect the job you do—even if you're not concerned with making over-all plant policy on wages? Plenty. Here's an example:

So far the rules have left a lot of room for adjusting "inequities" in wage structures—as between companies, and within a plant. Can you expect that to continue? Or will the Board get to a clamping-down point? If it is going to clamp down, then you'd better let your top management know what should be done in your department before it's too late—and not wait for inequities to iron themselves out normally.

The point is, you'll do best all along the line if you're able to anticipate what is likely to happen, and get ready for it.

You'll need to stay ahead of the headlines. Of course, you can't always call the shots in advance—but you can pretty much figure out the possible alternatives, and prepare yourself accordingly.

To do this job, you have to do more than follow the rules as they come out. You have to know the men who make them—and know how their thinking goes. With this basic understanding, you can fit into their proper places the fragments of "news" that you get in your newspaper. In other words, you'll be reading to help you decide what's likely to happen in the future, not to find out merely what's already been decided and done.

The personal matter of your own salary will pretty much depend on wage rules. The policy of the Salary Stabilization Board seems generally to be to let salaries stay at their usual ratio to wages—though the technical rules of the wage and salary boards may differ widely.

Here, too, your ability to look ahead is important. Is your salary likely to be "frozen," or can you afford to count on its moving ahead a bit? The answer will help you determine what kind of financial commitments you're smart to take on.

So, we're giving you (on the next seven pages) background information to help you "know" the WSB—its members and the way they look at their job. We think this is basic data for everyone in the factory who has anybody working for him.

Begins on page 83

THE SIX PUBLIC MEMBERS OF THE WAGE STABILIZATION

NATHAN P. FEINSINGER, Chairman

Incisive, cuts through trivialities. Gets along with management, but better with labor. Liked by board members, staff. More at home settling disputes. On leave as University of Wisconsin law professor. During World War II, specialized in trucking disputes, served on NWLB. Post-war, headed Truman fact-finding panels in steel, meat packing.

FREDERICK H. BULLEN, Vice Chairman

Runs most WSB meetings because other duties keep Feinsinger busy. Worked hard on inter-plant wage relationships. Dispute mediation his specialty. Is on leave as secretary, New York State Mediation Board. During war, handled disputes for, and later headed, Cleveland regional WLB. Served briefly as Ford-UAW-CIO umpire. Oddly, both Feinsinger and Bullen are strong on dispute settlement—the least of WSB's current problems.

WILLIAM M. HEPBURN

Quiet, thoughtful dean of U. of Alabama Law School. Handles knottier problems that require more thinking. Looks after bonus and new plant wage policies, enforcement, independent unions. More conservative than colleagues. New to Washington, but not wage controls. Was vice chairman, during war, of Atlantic regional WLB.

BENJAMIN AARON

Young, bright. Made impressive record handling wage controls in aircraft and tool and die for War Labor Board. Arbitrator in aircraft and other industries on West Coast. On WSB, specializes in disputes, welfare plans, tool and die and aircraft matters. Stands well with management, despite friendliness to labor. Graduate of Michigan, Harvard Law.

JOHN T. DUNLOP

Harvard economics professor, most prodigious worker on WSB. "Don't know what we'd do without Johnnie," says Chairman Feinsinger. Expert on wage rates, author of textbook. Carries major burden on wage policy formulation. Impartial umpire for building trades jurisdictional disputes. During war, handled construction wages for NWLB, was White House trouble-shooter on labor problems.

THOMAS F. COMAN

WSB's newest, greenest member. For ten years observed WLB, WSB, and other Washington labor developments from the outside. Now on inside, giving WSB benefit of one who analyzed wage rules daily as labor reporter for Associated Press and, most recently, Bureau of National Affairs, a private labor service. Stoical, down-to-earth, unexcitable. Notre Dame graduate.

What kind of men are . . .

. . . YOUR WAGE POLICY MAKERS?

By J. M. GAMBATESE
Labor Editor, McGraw-Hill Washington Bureau

HERE, AND ON THE NEXT TWO PAGES, are the men who can make or break wage stabilization. The public members hold the big stick. When labor and industry members disagree, these six men cast the deciding votes.

The industry members (next page) are *your* representatives—not to vote the way you want, but to reflect accurately the kinds of problems you face, and the kinds of solutions you can live with.

The labor members (page 87) make no bones about their desire for "more," and they're constantly fighting for it. They're usually successful.

Many serious observers fear industrial management has been altogether too complacent so far about stabilization, and about the men behind it. Here are brief "profiles" of the Board members—their backgrounds, and how they are oriented.

To run your business smartly, you have to anticipate the direction of such controls as wage stabilization. If you're too rigid in interpreting the rulebook, you're asking for labor trouble later. If you're too loose, you may end up in a mess with the government.

Knowing something about the men on the Board will help you do your anticipating—on what the WSB members may do about general wage policies, and about the specific issues that may arise in your industry or your plant.

Turn the page to meet the industry and labor members

Begins on page 83

THE SIX INDUSTRY MEMBERS OF WSB

ALEXANDER R. HERON

Acknowledged leader of industry side. Scholarly, former school teacher, author. Human-relations conscious, strives to be objective. Vice chairman of NAM industrial relations committee, considered "liberal" in labor relations circles. On leave as vice president and industrial relations director of Crown-Zellerbach Corporation.

HIRAM S. HALL

Industry's best technician of WSB. Carried ball on Regulation 5 (merit increase) and incentive policies. Like Heron, leans backward to be "fair." Sharp, quick on the uptake. Good negotiator. Personnel vice president at Bigelow-Sanford Carpet Company. Previously, in aircraft industrial relations, labor law instructor at New York University.

MILTON M. OLANDER

Middle-of-the-roader, steady, good "team" man. With Heron and Hall, makes up "liberal" side of industry group. Coached football at Western Michigan and U. of Illinois. Member of U. S. Chamber of Commerce labor relations committee. Served as U. S. industry delegate at International Labor Organization conferences at Paris, Mexico City, Montreal. On leave as industrial relations director, Owens-Illinois Glass Company.

RICHARD P. DOHERTY

Economist, headed economics department, Boston U. Aggressive, scrapper. Good in special industry problems, particularly movies, radio. Not as "liberal" as Heron, Hall, Olander. For five years ran Boston Industrial Relations Council. Came to WSB from National Association of Broadcasters, director of employee-employer relations.

G. MAYNARD SMITH

Southern lawyer, able, personable, conservative. Industry side's "legal eagle," is big help in drafting language of WSB regulations from industry viewpoint. Member of Atlanta law firm specializing in labor relations, taxation, general corporate practice. Former prosecutor, special assistant to Attorney General Biddle.

GEORGE W. ARMSTRONG, JR.

Most conservative, vocal industry member. During war, was industry member of Dallas regional WLB. A steel industry executive, worked for four steel companies before entering Texas Steel Company in 1923. Is now president. Also president of Trinity Oxygen Company, director of a railroad, and, like a real Texan, in the cattle business.

THE SIX LABOR MEMBERS OF WSB

ELMER E. WALKER

Ranks No. 1 on the labor side for all-around work and effectiveness. Aggressive, loud, tablepounder, hard bargainer. Considered an obstructionist at the beginning, but his contribution to WSB has improved. Had World War II experience on National War Labor Board and War Production Board. Worked at tool and die trade until 1933, became paid agent of AFL's International Association of Machinists. Now IAM general vice president.

JOSEPH A. BEIRNE

Example of new-type CIO leader, young, able, smooth, fluent speechmaker. Most active of CIO members, specializing in health and welfare policies. Helped organize white-collar telephone workers in independent union, later took them into CIO as Communications Workers of America. Has been union's only president. At 40, is CIO's youngest vice president.

JOHN W. LIVINGSTON

Another young CIO leader, survivor with Walter Reuther in the rough and tumble of the turbulent United Automobile Workers. As UAW-CIO vice president, adheres to Reuther views. Started his climb with Reuther in union's General Motors Department after heading local union at St. Louis Fisher Body plant. Formerly regional director for Southwest. Duties as vice president and head of UAW-CIO aircraft department cut into time at WSB.

EMIL RIEVE

An "old workhorse" in CIO, also served on World War II's NWLB. Heads up CIO's committee on economic policy, president of Textile Workers since 1939. Rough, blunt, wisecracker. Has had problems that keep him from playing a bigger role at WSB: labor problems in textiles, collapse of CIO's southern organization drive, and internal union political fight. If he wins his union fight, he could be next CIO president.

HARRY C. BATES

Old-line building trades spokesman. Doesn't help much on general policies. Away most of the time on union business. A Texas bricklayer, moved up slowly in AFL Bricklayers Union, became president in 1936. Member of AFL executive council. During war, helped NWLB control construction wages.

WILLIAM C. BIRTHRIGHT

Out of place at WSB. Doesn't attend regularly. No wage-control experience. As president of AFL barbers' and hairdressers' union, has little association with wage rates or collective bargaining. Most union barbers are self employed. Moreover, barbers and hairdressers are exempt from wage-price controls. Sixth vice president of AFL. May give up his place on WSB.

Turn the page to read WSB Chairman Feinsinger's answers to some pertinent questions FACTORY put to him

Is the WSB Botching the Wage Stabilization Job?

No, WSB isn't botching the job, says Chairman Nathan P. Feisinger. And here he tells why, in answer to pointed questions from industry, relayed by FACTORY. You may not agree with his answers, but they give you an insight into the thinking of the men who are making your wage policy.

1 The WSB is supposed to stabilize wages, yet they continue to go up. Doesn't this mean the Board has failed in its job?

The figures show that WSB has *not* failed in its job. The rapid wage movements touched off by the Communist invasion of Korea were materially slowed when our controls were put on.

Consider average hourly earnings (excluding overtime and inter-industry shifts) from January, 1950, to June, 1950, the month of the Korean invasion. The movement was orderly; there was an average monthly increase of just a bit over two-tenths of one per cent (0.216%).

What happened after Korea is shown in the figures for June, 1950, to February, 1951. Average hourly earnings went up at a monthly rate of almost eight-tenths of one per cent (0.786%) during this frenzied, speculative period.

But from February, 1951 (when stabilization took hold, following the freeze of late January), to July, 1951, the rate was perceptibly slowed down. Average hourly earnings moved at a monthly rate of less than four-tenths of one per cent (0.366%). The total percentage increase for this half-year period was 2.2%, compared to 7.08% for the half year before the freeze. If prices can be controlled, this slowing down process will continue.

2 Why all the complicated rules and regulations? Why not just a flat freeze, so simple that everybody can understand it? Then you'd really get control.

Here's why a "freeze" won't work:

First, Congress itself decided not to freeze but to stabilize wages and prices. Congress knew what it was doing. History shows that in a dynamic economy like ours, a freeze can't work, even in time of war. This is the lesson of experience.

Second, Congress did not provide for wage stabilization in a vacuum. It said that in stabilizing wages, every effort should be made to (1) maintain industrial peace, (2) preserve collective bargaining, and (3) foster defense production.

A freeze is penny wise and pound foolish if it results in strikes which impede production or destroy the recognized values of collective bargaining.

Third, even a freeze would have to leave some room, as Congress pointed out, to prevent or correct "hardships or inequities." Some inequities can and must be frozen. We cannot do business as usual either on the price or wage front.

But there are some inequities which *cannot* be frozen without sooner or later causing a breakdown of the whole stabilization program. Let me give some examples of what a freeze would mean:

Nobody could get a raise for merit or for experience, even though he had become a more productive worker. An employer manufacturing potato mashers and getting along with low-paid labor, who found himself with an important defense order, would be unable to raise wages to a point to attract the kind of labor he needs. Perhaps we should not let such an employer pay top wages or even average wages. But should we cut him off from the possibility of any wage increase, even though it might not unstabilize rates in the area or industry?

Or suppose an employer who for the first time can afford to give a week's vacation with pay, when that is the prevailing practice in the industry or area, decides to give it. Now, is the economy helped by saying *No*? Of course, if he attempts to go above

prevailing practice, and starts a new pattern, that is a different matter; *that* our rules prohibit.

It doesn't help the economy or the war effort to prohibit an increase in take-home pay as contrasted with rates. For example, if men work overtime, they make more money, but we get value received in increased production. If men work harder on incentive, to get out production, again they make more money, but we gain more than we lose.

The important question is not what we pay, but what we get for what we pay. The main job of the Board up to now has been to prevent increases, which the employer is ready to give for the asking, because a tight labor market, cost-plus contracts, and other incentives remove the normal restraints found in the collective bargaining process. The Board's regulations in effect are a substitute for those restraints.

3 Isn't it just adding fuel to the inflationary fire to allow automatic cost-of-living raises? Don't you have to draw the line somewhere, to get inflation on the run?

Cost-of-living "escalator" clauses were rare in the days just prior to World War II. No more than 200,000 workers were covered by them, and only in a few industries, notably shipbuilding. The War Labor Board could, and did, toss these clauses out without creating any upheaval in industry.

Since the war, however, the principle of escalator clauses has been widely, although not universally, accepted in industry as a stabilizing factor in labor-management relations. Between three and four million workers are now covered by them.

The Economic Stabilization Administrator realized that rejection of these clauses would disrupt stable industrial relations. So, on March 8, 1951, he issued General Wage Regulation 8, which approved the operation of these clauses through June 30, 1951 (later extended to July 31, 1951) if they were negotiated prior to January 25, 1951.

Also, on April 24, 1951, he approved newly negotiated escalator clauses covering a large segment of railroad workers, adding a million or more workers to those previously covered in the automobile and numerous other industries.

These were inescapable facts confronting the present Board when it began its deliberations on major wage policy. The widespread existence of escalator clauses and the official sanction of them, however temporary, could no more be ignored—to borrow a favorite expression of Dr. George W. Taylor—than an elephant can be swept under the rug: It shows. Reversal of the trend by the Board would have been practically impossible even if otherwise sound—which it would not have been.

Thus, up to August 23, 1951, the nation's workers and employers were divided into two classes—the have's and the have not's. On one side were those who were assured of maintaining their "real" wages through the operation of escalator clauses; on the other side were those who were not so assured. And those unions which had rejected escalator clauses in favor of wage reopenings, because they thought they could get *more* than mere cost-of-living increases, could not, under Board regulations, get even as much.

So, by unanimous action of the Board, concurred in by the Economic Stabilization Administrator, this inequitable situation was corrected. General Wage Regulation 8 was revised. Roughly, it approves cost-of-living escalators and permits those employers without escalators to make cost-of-living adjustments every six months.

To critics of cost-of-living policy who contend it is inflationary, I should like to give these reasons for our belief that it is actually stabilizing:

First, it preserves the stability inherent in long-term escalator contracts. Most of them have either explicit or implicit no-strike guarantees. Nullification of escalator clauses would mean nullification of the contracts, and, inevitably, wide-spread strikes. The ultimate cost of knocking out escalator clauses would be greater than keeping them.

Second, it assures equal treatment to all workers and stops any suspicion that some are getting ahead of others. Never under-rate the effect that a feeling of injustice can have on productivity.

Third, it gives order to what would otherwise be a recurring battle for wage increases whenever the cost of living went up, with the probability that mounting pressures would force the government to yield to a much more costly wage policy.

Fourth, under our policy, cost-of-living adjustments can be given only for *past* increases in the consumer price index, usually with a time lag. The index is published about six weeks after the fact, and cost-of-living adjustments are usually made no more often than once in three months.

If we hold down the cost of living, Regulation 8 will cost us little or nothing. If we do not, it is nevertheless equitable and sound. At the very least, it deserves a fair chance.

4 Hasn't the WSB's approval of cost-of-living increases encouraged unions to think that a cost-of-living raise is just the *starting point* in wage negotiations?

This criticism, in my opinion, puts the cart before the horse. Cost-of-living increases *are* the starting point in wage negotiations, and have for years been recognized as such by both labor and management. Anyone familiar with collective bargaining negotiations knows that, by and large, on reopening or termination of contracts, an increase in wages to compensate for the increase in the cost of living

since the last negotiated contract constitutes the minimum demand by the union and the minimum concession by the employer. This is simply a fact of industrial life.

Consequently, if the WSB is to pay *any* attention to the facts of life in collective bargaining over general increases, it is clear that the least costly program we could adopt is the principle of cost-of-living adjustments.

I might add, incidentally, that labor by no means regards a wage policy pegged to increases in cost of living as a triumph for its point of view. Its spokesmen are bitterly opposed to what they describe as the "European bread-basket theory of wages." They object to having to run in order to stand still. They believe they are entitled not only to maintain their standard of living but to improve it. Since workers, like the rest of us, have to pay increased taxes, they are not really assured of even maintaining their living standards.

5 WSB has stayed out of disputes and strikes that the old War Labor Board would have moved right in on and settled. How come?

The Wage Stabilization Board has quite different functions from the War Labor Board, and operates in quite a different setting. In World War II we had a no-strike pledge. This time, labor has not so far been asked for such a pledge. Under the War Labor Disputes Act, the WLB could take disputes on its own initiative, without regard to the wishes of the parties. The WLB had subpoena powers to compel attendance at hearings. Nearly all disputes, sooner or later, came to the WLB for decision, as if on a transmission belt.

The WSB is not and does not purport to be that kind of agency. This Board has no authority to intervene in labor-management disputes on its own motion, to order wage increases, or otherwise to impose itself forcibly on the parties. Our jurisdiction is limited to the authority conferred by the President in Executive Order 10233. The President may refer a case to us for our *recommendation* when, in his opinion, the dispute "substantially threatens the progress of national defense."

Also, the *parties* to a dispute may voluntarily submit it to us for our recommendations or decision. The Board will accept such a submission only if the dispute "threatens an interruption of work affecting national defense," and if we think our taking the case is justified under all the circumstances. I wish to emphasize that the President will not refer a case to us, and we will not take a case under voluntary submission, unless the parties have made full prior use of mediation and conciliation.

Meanwhile, it is important that all concerned understand how the members of the Wage Stabilization Board view the Board's relationship to collective bargaining.

It is our intention, expressed in a unanimous statement, to stay out of the collective bargaining room. It is not up to our Board to say in advance what labor and management may agree to, but rather to lay down general rules as guides.

We firmly believe that collective bargaining agreements should be made honestly, in good faith, and within reason. We think labor and management are squarely within those bounds when they reach an agreement that they know is within our regulations, or which they feel may constitute a valid exception to our regulations, or which they believe justifies a change in our policy.

The Board hopes there will be no encouragement to parties to reach agreements outside those bounds. This type of agreement, or demands leading up to it, or announcements by employers that they intend to ask for approval of exorbitant increases, may have serious consequences. They tend to raise false hopes among workers. In such a case, it is often the stabilization program, rather than the parties to the agreement, that becomes the object of wrath by disappointed workers. The result is strained relations, a weakened stabilization program, and the danger of stoppages in vital defense production.

The public should know that it is not what is demanded in negotiation, nor what is offered in counter-bargaining, nor even what is agreed on that constitutes the criterion of wage stabilization policy. That policy is not set by wage demands, counter-offers, or agreements. The question is what the Wage Stabilization Board will decide about the agreement after it has taken a good look at it. That is where you will find national wage stabilization policy.

6 There are rumors that some companies are violating WSB rules right and left. What is the Board doing about this situation?

There are violations. Some can be cured by education. Others are deliberate and require stern treatment, if law-abiding employers and employees are to be protected.

We are embarking on a vigorous enforcement program. The Board's enforcement and litigation division will direct investigations and head up the prosecution of violations. The National and Regional Enforcement Commissions will sit in a quasi-judicial capacity to determine whether there have been violations and what penalties should be invoked. The labor and industry members of the Board are agreed that these commissions be composed entirely of public members.

Spot checks of about 10% of the plants in the country will be conducted this year. For the month of September alone, 2500 investigations were authorized.

Spiral Conveyor Is Missing Link...

. . . in bottle packaging line that was automatic except for break between capping operation and labeling on floor below. New way is faster. Minimizes breakage. Keeps production on the move. Eliminates manual handling. Boosts output 50%.

PROCESS • Production line at Miles Laboratories, Inc., Elkhart, Indiana, makes Alka-Seltzer tablets, seals them in glass bottles, 1 3/8 inches in diameter by 6 inches high, packages bottles for shipment.

PROBLEM • New automatic machine line fills, caps, labels, and packages bottles 50% faster. But it requires a second-to-first-floor handling system to make the process continuous. The handling method must move bottles at record speed—over 200 a minute. It must move them in single file, standing up—the way the machines handle them.

OLD WAY • Twelve handlers—four on each shift—moved bottles from capping to labeling by truck and elevator. Also, the labeling machine operator manually set bottles upright to feed machine.

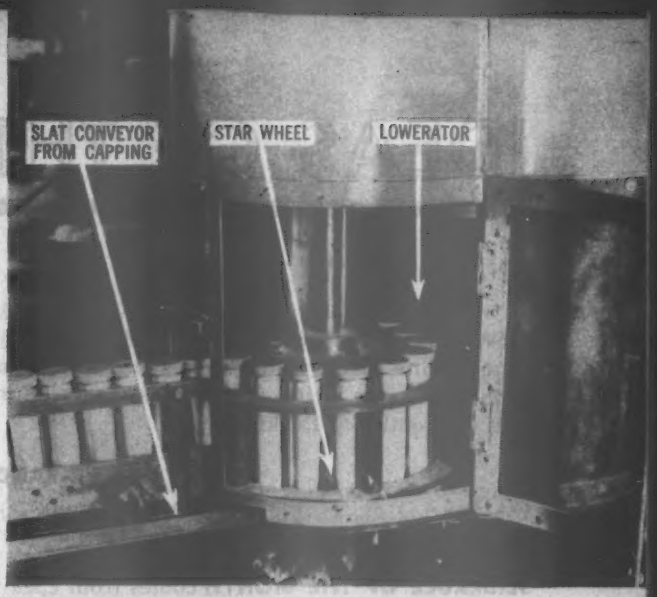
NEW WAY • A specially designed "lowerator" solved the handling problem. It meets every requirement—and then some. Here's how it works:

Bottles leave the capping machine on the upper floor standing up. They ride a chain-driven slat conveyor to the "lowerator." Here a star-wheel feeder picks each bottle off the conveyor, rotates it half a turn, and spots it between vertical rods on the lowerator tube. A variable-speed motor, controlled from either floor, rotates the tube.

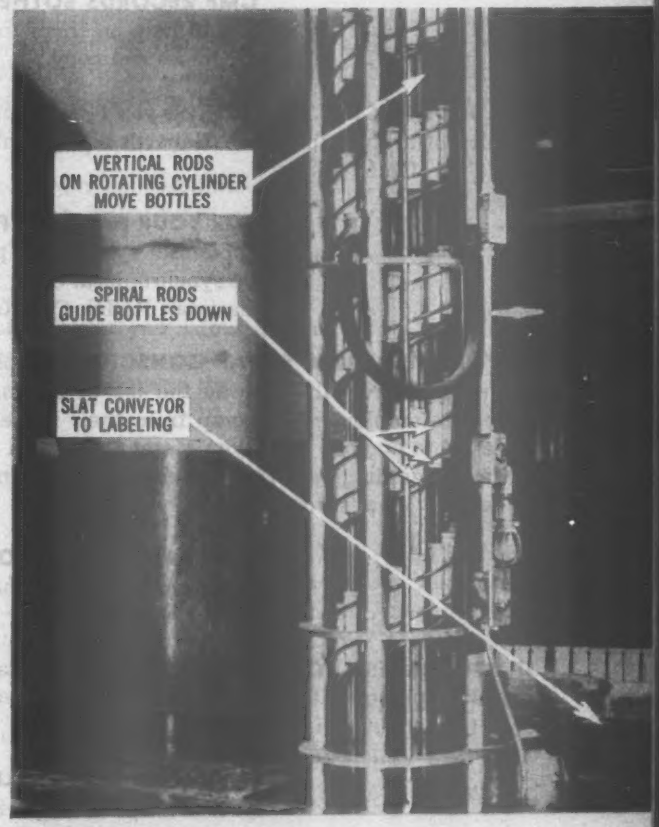
The rods, attached to the tube, push the bottles around. The bottles slide downward on a ½-in. rod that's spiraled around the tube and rigidly held by the framework. Two other spiral rods hold the bottles upright, keep them from falling.

On the floor below, another star wheel moves the bottles onto another slat conveyor. It carries them—still standing up—to the labeling machine.

BENEFITS • The lowerator made it possible to handle automatically the 50% greater capacity of the processing machines. Eliminated manual handling. Released 12 handlers for productive work. Reduced bottle breakage and damage to caps. Saved space (lowerator occupies only 1½ square feet of floor).



STAR-WHEEL FEEDER picks each bottle off the chain-driven slat conveyor (from bottle capping). The synchronized feeder spots each bottle between vertical rods on the rotating cylinder of the . . .



. . . LOWERATOR which gently but quickly spirals bottles down to a slat conveyor that takes them to labeling and packaging machines. The vertical rods on the rotating cylinder push the bottles; they slide down a supporting ½-in. rod. Two other spiraled guard rods keep bottles upright.

IDEAS OF THE MONTH for

By LEWIS K. URQUHART • Managing Editor, FACTORY

NEW WRINKLE FOR REMOVING WRINKLES in welded seams: With its straight-line action, Sundstrand's air sander removes scratches and defects without leaving swirls or pressure marks. Sundstrand Machine Tool Co., 2531 Eleventh St., Rockford, Ill.

ROUND RUBBER BANDS are easier to pick up than standard oblong ones. And they're stronger, too, says the maker, Alliance Rubber Co., Alliance, Ohio. Cost no more per pound than the old style.

SLIDERULE OF THE MONTH comes from Cleaver-Brooks Co., 326 E. Keefe Ave., Milwaukee 12. It'll speed computing your steam costs. Shows comparative costs per 1000 pounds of steam, using coal, oil, or gas at various prices. Rule takes into consideration system's efficiency.

CMP RECORDS BOTHERING YOU? Small companies, particularly, will get lots of help on them from "CMP Made Easy." Write Diebold, Inc., Canton 2, Ohio, for a copy.

WELDER'S POCKET "BIBLE" gives you 44 pages of information: A brief A-to-Z story of arc welding (and Hobart's equipment). Write: Hobart Brothers Co., Troy, Ohio.

FOR YOUR FACTORY PHOTOGRAPHER: Flash holder with built-in battery condenser system has pistol grip. Up to seven Ektalux extension units can be synchronized. Cost: from $34.75 to $39.50; extension units: $14.50. From: Eastman Kodak Co., Rochester 4.

GETTING WORKERS SCRAP CONSCIOUS helps cut costs, helps the scrap drive. If you're willing to do the job of sorting out the usable scrap, an appeal to employees for scrap from their homes can help plenty. Turn to page 254 to find out how Lyon Metal did it. And don't forget that steel mills need non-production scrap. General Motors turned up 19-million pounds in 10 weeks. What's your score?

PIGEONS BOTHER YOU? Roost-No-More — humane and harmless — will keep 'em away. National Bird Control Laboratories, 1035 W. Lake St., Chicago 7, makes it.

IF YOU PLATE IN YOUR PLANT, better check Lea Manufacturing Co.'s "Copper-Glo" process. It's designed to save nickel and give you just as good results without it. Lea is in Waterbury, Conn.

INDUSTRIAL TAPE SELECTOR—five 8½ x 11 file cards in a file jacket—gives you descriptions, specifications, and samples of the full line of Polyken tapes. Get one from Polyken Industrial Tape, Department of Bauer & Black. 222 W. Adams St., Chicago 6.

PEEP HOLE IN THE PACKAGE helped Wenczel Tile Co., Trenton, eliminate shipping errors in colored tile. Customers like it, too. Stone Container Corp., 4200 42nd St., Chicago, makes the cartons.

Factory Executives

BOOKLET OF THE MONTH is easily Yale & Towne's *The How Book of Cost-Cutting Materials Handling*. It's a revision of Y&T's 1947 booklet. We liked that one. Like this one even more. Gives you basic dope, a comprehensive plan for evaluating your present handling methods, plus some forms to help you study your handling system. Get the booklet and forms from Y&T, 11,000 Roosevelt Blvd., Philadelphia 15.

MORE HOLES FOR LESS. And with lots less scrap. That's what Dumore Co., Racine, Wis., says about its new grinder for 2-lip straight- or tapered-shank twist drills.

EVER BUNDLE TWIGS? It's tough. So's bundling tubing with bends, weaves, or kinks. Mackintosh-Hemphill has a rotary straightener to take out the kinks! Meets straightness specs of 0.005 inch per foot. You can get more dope from the company at 901 Bingham St., Pittsburgh 3.

PENNY SHORTAGE is getting serious again. But it's a nuisance to count pennies. That's why we hoard 'em. If you have a Rap-a-Coin, you might help beat the shortage by offering to count and wrap pennies for employees. This $7.50 machine does both. Made by Henderize, Inc., 5667 Freeport Blvd., Sacramento, Calif.

MY ACHING DOGS! Industry loses $600-million a year from 'em. Oscillation Equipment Co.'s vibrating aluminum cylinder will cut it. Helps blood circulation in your feet. And you can keep your shoes on! Write: 132 W. 72nd St., New York City.

GOT PACKAGING PROBLEMS? Bet you'll find an answer in the 64-page book *Motor Carrier Packaging and Inspection*, published by the Motor Truck Assn. of California, 2800 S. Alameda St., Los Angeles 58. Cost: $2.40 per copy. Less in batches of 10.

QUALITY CONTROL HANDBOOK is a complete reference work in one volume. We think it's a grand job. Edited by an old friend, Joe Juran. You'll find details on page 292.

STABILIZATION OF STEEL used to take years. Now it's done in a matter of hours. Steel's chilled to −120F in an industrial chilling machine built by Sub-Zero Products Div., Deepfreeze Distributing Corp., Cincinnati 29. Just switch the steel from the deepfreeze to room temperature. It's a good way to get dimensional stability in lapping plates and surface plates used in gage manufacturing.

YOU'LL KNOW WHICH WIRE'S WHICH if you label them with printed pressure-sensitive tape. Will help on hoses, too. It's dispensed from a little holder. Get it from Mark'Andy, 153 W. Argonne, St. Louis 22.

ALUMINUM "TIN" CANS may someday challenge the regular variety. Three-ply aluminum foil bonded with plastic. In the immediate future, the armed forces will get all Reynolds Metals Co., Richmond, can turn out. You'll have to wait your turn.

What! Standard Times for Handicraft Jobs?

No reason in the world why not, say Hand Knit Hosiery people.

So don't tell *them* your business is "different."

They're convinced, you see, that setting standard times on *your* product is no different, in principle, and no harder than setting them on hand embroidery.

Benefits? All the usual ones associated with standard times.

Plus this unusual advantage: Hand Knit uses standard times to pinpoint weaknesses so convincingly that operators are encouraged to do better.

By RALPH P. KREUTER
Director of Industrial Relations
Hand Knit Hosiery Company, Sheboygan, Wis.

This was our problem

• Some of our products are hand-embroidered. It's all done free hand. We don't use templates—for the same reason that you don't use a map every time you drive downtown. Takes too much time. An operator just "remembers" the pattern. It's quality work. Takes a long time to acquire a high degree of skill in it. And it's all on straight piece rates.

Our patterns are re-designed each year, and there

This is the way we solved it

STANDARD TIMES — EMBROIDERING

STITCH SYMBOLS	✳ Y Y		V		+	++ +++	++++	O		
NO. STITCHES	S	D Ð	S	D Ð	S	D	Ð	S D Ð	NO.	S	D Ð
2	.144	.147	.138	.141	.165	.168	.171	.153	1	.14	.17
3	.186	.191	.177	.182	.218	.222	.227	.200	2	.27	.33
4	.228	.232	.216	.222	.270	.276	.287	.246	3	.41	.50
5	.270	.278	.255	.263	.323	.330	.338	.293	4	.54	.66
6	.317	.321	.294	.303	.375	.384	.398	.339	5	.68	.83
7	.354	.365	.333	.344	.428	.438	.449	.386	6	.81	.99
8	.393	.408	.371	.384	.480	.492	.504	.432	7	.95	1.16

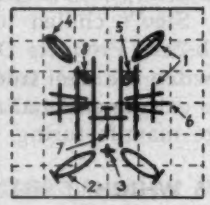
KEY TO SYMBOLS
SIMPLE STITCHES /// SPEARS → V'S V HODS Y BENT HODS Y
O-SPOKES ✳ C-SPOKES ✳ PILE KNOTS ✳ AROUND THE NEEDLE @
FRENCH KNOTS: 1@ + 2@ ++ 4@ ++++ DAISY STITCHES
THREADING TIME SINGLE THREAD S DOUBLE D MULTIPLE Ð

VARIABLES • INLAYS+5% HEAVY WORK +8%

OTHER STANDARD TIMES ▸	SKATE HOSE	TEPEE SOCK	PIN TWICE
Pick-up, insert board, pin	.11	.15	.18
Take out pin, board, away	.165	.22	.27

Here's how we set our rates

TEMPL. NO. 281 PERM. NO. 137



CALCULATION OF RATE

Standard time for stitches	2.097	
Pick up, insert board, pin	.110	
Out pin, board, away	.165	
Variables	.019	
Multiply by 24	2.391	= 57.384
Add needle time		3.260
Add Tie-up time		.300
Total Standard Time		60.944
Divide into 51' to get production per hour		.837
Divide this into 1.00 to get earned hours		1.195
Multiply this by base rate of 1.07 to get piece rate		1.279

PATTERN DESCRIPTION

REF.	S D Ð	NO. ST.	ELEMENTS	STD. TIME	NO. OF RE-THDS.
1	D	9	8 SIMPLE STITCHES AS HEAD AND EARS	.432	6
2	D	5	2 DAISY STITCHES AS BOW	.293	4
3	D	2	1 FRENCH KNOT CENTER 1@	.165	2
4	D	3	2 SIMPLE STITCHES AS EAR INLAY	.191	2
5	S	3	2 SIMPLE STITCHES AS EYES	.186	1
6	S	10	2-3 POINT C-SPOKES AS WHISKERS AND 3 SIMPLE STITCHES AS NOSE AND MOUTH	.480	4
7	S	2	1 SIMPLE STITCH AS TONGUE	.144	1
8	S	3	2 SIMPLE STITCHES AS EYE INLAYS	.186	1
				2.097	

Total standard time
Needle time S 7 = .95, D 14 = 2.31, Ð ___ = ___. TOTAL 3.26
Variables
EAR INLAY 5% OF .191 = .0095
EYE INLAY 5% OF .186 = .0093 • TOTAL .019

are about 250 new samples. Of these, about 150 are eventually selected for production. Costs must be estimated on *all*. We formerly did it on a "guesstimate" basis, with the usual bad results.

The re-design period takes four or five weeks. During that time we have to lay off most of our embroiderers. Unfortunately we lose some of them. So when we start up, we have new designs, therefore new piece rates—and the hard job of convincing a large percentage of newcomers and partially trained workers that the new piece rates are fair. All the patterns are new, even to the old-timers, so the morale of the department is naturally enough on the low side. Piece rates look suspiciously low—some so low that the operators are reluctant to try to make bonuses.

So we decided we needed some time standards for elements in any embroidery design.

• First we isolated the various types of stitches. We gave them descriptive names and adopted simple symbols. Then we tackled the job of finding standard times.

We set up an isolated workplace for one of our skilled embroiderers. We timed her for several days on one type of stitch after another—and on one typical pattern after another. We made a research task of it. We summarized, cataloged, calculated, recapitulated, and analyzed. Several basic discoveries emerged:

1. The visible *length* of a stitch makes little difference. The basic motions used to make it are the same. Large "O" spokes, we found, took no more time than small "O" spokes.

2. For a skilled operator, the "placement," or positioning factor of the various stitches, is uniform—except for V's, where it is somewhat less. So we found it practical to group various types of stitches in our table of standard times.

3. Operators spend from 6% to 28% of their time threading needles. The amount depends on size of pattern. So *this* time element has to be isolated and considered separately.

4. Variables—both *plus* and *minus*—can be set up to cover factors like heavy fabric, unusual complexity of design, or unusual simplicity of design.

We "table-ized" the results of our research work, taking the average of our good operator's best performance and assigning it a value of 150.

This rating factor may seem high, but we feel it is realistic. For one thing, we had asked the operator to perform at her full "cruising speed," *regardless of quality*. Why? Because we were out to measure basic motions, not quality. We provided for quality on a percentage basis in the high rating.

We later tested our standards built on this base by using our new standard elemental times to re-figure some old "guesstimated" piece rates that we knew from experience were close to ideal. The tests proved to our satisfaction that the new standards are accurate.

• Our next step was to teach our supervisors to develop piece rates from the standard-time tables. It wasn't difficult, because we took it step by step:

1. We developed a "stylized" way of sketching patterns, using symbols to indicate our basic stitches. It was simple and fast. No artistic ability was required.

2. We designed a form (illustrated at left) with a "sketching place" complete with lightly lined squares and diagonals to help the supervisor get the proportions right.

The form also provides a place for a "technical" description of the pattern, element by element—or basic stitch by basic stitch, if you want to put it that way. The number of needle re-threads is also shown. So are any variables. The *number* of stitches is shown, too. In fact, it gives the supervisor all the data needed to select the standard times from our table.

We have a job evaluation system here that results in various base rates for different jobs. We express all our time standards in "earned-hours," priced at the various base rates. We compute our payrolls on an earned-hour basis. But dollars and cents seem to mean more to our people, so we show both earned hours and dollars and cents on our piece rates. This means a little extra work, but it's better understood motivation—and probably more effective because it is better understood.

On the rate form for each pattern we list our standard times (in minutes) and multiply them by 24 (because there are 24 sock or mitten patterns to a dozen pairs). We could just as well

have done this multiplication in advance and included it in our tables of standard times, but our operators like our tables as they are. They are more easily checked with actual performance, one pattern at a time.

Total standard time is divided into 51 minutes—to get standard production per hour. We allow the nine minutes in each hour for fatigue, slowdown, talking, drinking pop, eating candy bars or sandwiches, and so on. There are a hundred

And here's a big plus value we got

OPERATION *HAND EMBROIDERING* DEPT. *EMBROIDERING* DATE *4/15/51* STUDY NUMBER *51/375* JOB INSTRUCTION NUMBER *901*

STYLE *137* SIZE FOREMAN *MILDRED KREGEL* TIME START *9:35* TIME STOP *10:02* PRODUCTION DURING STUDY *5 PR.*

CLASS *1/51* EQUIPMENT *FLAT BLOCK* CONDITIONS *USUAL - EX*

PRESENT RATE PRESENT PRODUCTION *10/PR. HR.* OPERATOR *HILDEGARD TUPPER* COMMENTS RATING *(SEE ABOVE)*

	THD.	ELEMENTS	STS.	1	2	3	4	5	6	7	8	9	10	ACTUAL AV.	SAL. AV.	TIME OUT NOTES STD.	%	RATE
1		GET		7	8	7	8	9	8	7	10	8	9	.081	.081	.11	.736	136
2	D	HEAD AND EARS	9	34	(42)	30	31	(52)	33	32	32	33	29	.348	.318	.452	.704	142
3	D	BOW	5	23	24	23	25	25	25	24	25	(30)	27	.259	.246	.293	.839	119
4	D	FRENCH KNOTS	2	15	16	16	18	16	17	16	15	17	16	.162	.162	.165	.981	102
5	D	EAR INLAY	3	17	16	15	15	(19)	15	(25)	15	17	16	.170	.158	.201	.786	127
6	S	EYES	3	14	14	14	13	14	14	15	14	14	14	.14	.14	.186	.753	133
7	S	WHISKERS, NOSE,	10	34	35	(36)	35	36	34	41	(49)	34	32	.386	.351	.480	.731	137
8		MOUTH																
9	S	TONGUE	2	10	11	8	10	9	11	9	8	10	12	.098	.098	.144	.68	147
10	S	EYE INLAY	3	16	17	15	(20)	15	18	15	16	(30)	18	.18	.163	.20	.815	123
11		AWAY		9	12	10	11	11	(15)	10	9	8	10	.105	.10	.161	.62	161
														1.929	1.817	2.392	(av. 132)	
														.94		RATE ESTABLISHED AND FOREMAN'S APPROVAL		

COMPUTATIONS

2.392
34
57.41
3.26 n
.30 TIE
60.97

$\frac{60.97 \text{ MINS.}}{51 \text{ MINS.}} = \frac{1}{.8378} = 1.194$

PROD. PER HR. FOR AVERAGE GIRL

833 — HILDEGARD'S PRESENT PRODUCTION ONLY ABOUT 100% INSTEAD OF

HRS.—EARN.—TIME SEC. X.....	BASE RATE	PIECE RATE
1.194	1.07	1.28

(R) 5/7/51

There were other advantages, too

• In addition to pinpointing weak places in performances in such a convincing manner as to provide encouragement to do better, we found these other advantages:

1. With standard times and our pattern-description sheet, *several* people can be quickly trained to estimate costs. Thus we can get our estimated costs quicker and more accurately. No more need to "guesstimate" and just hope we're right.

2. Piece rates, too, can be set sooner and more accurately.

3. Our supervisor has more confidence in the piece rates. She can explain them better to newcomers. It's easy for her to demonstrate their fairness. She can say, for instance:

"These piece rates are set by using the same

And, of course, some disadvantages

• There are a few *disadvantages*, or rather dangers, in building up and applying standard times. In the first place, there is always a chance of getting so messed up in red tape and detail that the whole project becomes an additional expense instead of a saving.

There is another danger. Just because standard times are accurate in a comparative sense, you mustn't jump to the conclusion that they will in themselves provide adequate motivations for a high (or "best level") performance under any and all conditions and with any and all people. It's an easy mistake to make and one that can have serious consequences.

and one things people do during the day besides working at their "cruising speed." (The allowance is different on other operations in the plant.)

Production per hour is divided into 1.00 to give us the standard hours for each dozen pairs—in other words, the hours earned by the production of each dozen pairs.

This figure, multiplied by the base rate of that department (set by job evaluation) gives the piece rate in dollars and cents.

• Now let's see what we have gained. The usual advantages of standard times are no secret to any time and motion study man, of course. But we think maybe we have added something:

By making special time studies of individuals we can compare their actual times, element by element, with standard times. Then we can point out their particlar weaknesses. Perhaps we can encourage them to do better.

Take Hildegard Tupper, for instance. At the left is a time study of her performance on pattern No. 137. Readings for the 10 observations of 11 standard elements are in hundredths of a minute.

Note the circles on some of the times at which we clocked Hildegard. These are abnormally high and we eliminated them, arrived at a selected average which is 94% of Hildegard's actual average (1.817 ÷ 1.929). Small encircled readings just below lines 2, 3, and 7 are needle re-threading times.

We have also written in the standard times from the pattern description, and found the ratio of one to the other, putting our answers in the "%" column.

Then we have converted these "percentages of standard times used" to regular ratings that are customarily used in leveling a time study. We noted that while a comparison of the total selected average time with the total standard time would yield a rating of 132%, the ratings element by element, are not uniform. Hildegard is having considerable trouble with her "French knots," some with her "daisy stitches," and only a little less with her "inlays."

Her re-threading times — the small encircled readings just below line 2, 3, and 7—look good in comparison with the standard times in our table. So we haven't rated them separately.

The standard production per hour of this design is 0.837 dozen pairs. Hildegard's actual daily production is 10 pairs or 0.833 dozen pairs an hour—just about standard. But during the time study, Hildegard performed 32% above standard.

How come? She should be producing considerably more and earning not just base rate but at least a third more. Hildegard herself supplied the answer when we discussed the entire matter of standards with her, away from the others:

"I guess I didn't really believe I could make much over the base rate. But if I'm really *that* much faster, I can certainly do more."

She did, too.

---

time values that the girls last year made $1.50 an hour on. Maybe you can't do it right now. But you'll soon be able to if you try."

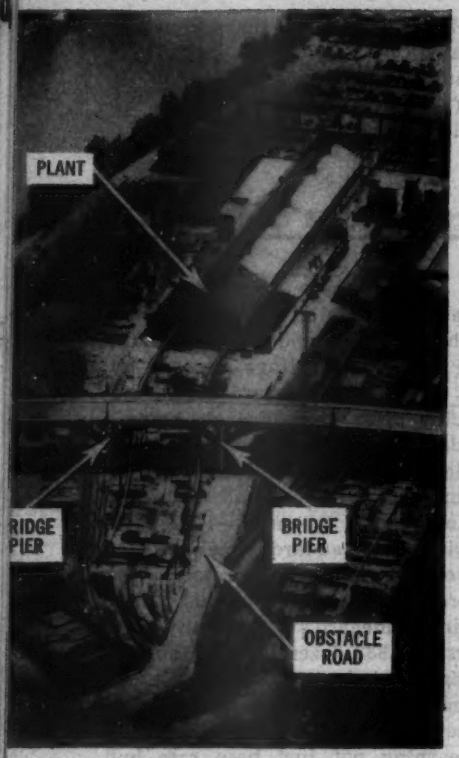
4. With these standard times, it becomes easier to train an assistant for time study work. Judgment in rating can also be developed, at least to a limited degree. The trainee rates an operator, then checks the rating with standard time.

5. Naturally, since piece rates and cost estimates can now be made by others—and since an assistant can be better trained—the time and motion study man gets out of a lot of work.

That's of considerable importance because it provides him with extra time which he can use to good advantage on something that needs his training and experience.

Accurate time standards are certainly well-established as good incentives, or motivations—but they *alone* are not always so. Many other things count, too—good supervision, adequate base rates, a high morale leading to a strong will to really hit the task. They're important, too, and confidence in time standards is no excuse or reason for overlooking them—or any other non-monetary motivations.

So the best advice we can give when you're setting standard times for handicraft jobs is, avoid any feeling of complacency. The fact that your standard times are *accurate* is no assurance that they will be *adequate* under any and all circumstances.



THE PROBLEM:

How to set up an overhead bridge crane to run in straight building and curved storage yard, dodging highway bridge piers and road.

THE SOLUTION:

Crane rides S-curve rails in the storage yard, misses the obstacles. The same crane rides straight rails inside the building. Transfer points in the rails and two sets of flanged wheels of different sizes guide the crane automatically. The photos on the facing page explain how.

A BRIDGE IN THE WAY—SO . . .

...Crane Runway Makes S-Curve

WHAT DO YOU DO when you want to extend a crane runway—and run smack into a couple of bridge piers?

Curve your runway between them, say engineers of Lehigh Structural Steel Company, Allentown, Pa.

That was precisely what they did. Shepard-Niles Crane & Hoist Corporation collaborated by designing and building two special cranes that will travel on S-curve rails.

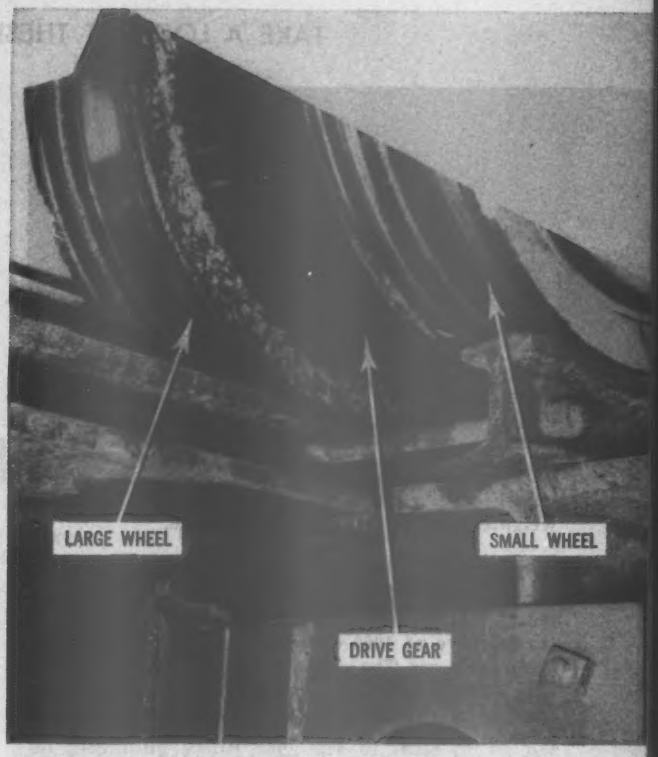
Expensive? No. The engineers say this crane installation cost only 10% more than a normal straight-rail job. And this new type of crane, reported to be the first in the United States, eliminated costly steam-crane handling of steel.

WHY AN S-CURVE RUNWAY · Lehigh Structural Steel needed more work and storage space in a fabricating shop—another 100 feet of shop and about 450 feet beyond the building for yard storage. Only one end of the building could be extended. There was only one way to go.

Big question: How to handle the heavy loads in and between fabrication and storage? Overhead traveling cranes were plainly the answer.

But a 450-ft. straight-line extension of the crane runway from the building ran smack into one pier of a highway bridge. And a single pair of parallel curved lines drawn from the same points hit another pier and a road.

The only way to miss both piers was to build a runway with two curves—the first one away from the first pier; the second, reversed, away from the second pier and the road. The photograph shows how the runway curves between the two bridge piers.



DETAILS OF DESIGN THAT MAKE THE S-CURVE FEASIBLE:

Transfer point is located where the crane must change direction. The break and offset in the rail shift support of the crane from one to another set of wheels—from outside to inside pair, or vice versa.

Outside (left) wheel is larger in diameter than inside (right) wheel. On four large wheels the crane travels straight. On two large wheels on one end of the crane, two small ones on the other, the crane curves.

HOW CRANES RIDE AN S-CURVE · Two design details keep the crane traveling smoothly on the runway—whether straight, left, or right:

1. There are two sets of wheels of different diameter. Altogether there are *four* wheels at each end of the crane bridge. The outside wheels of each set are 1¼ inches larger in diameter than the inside wheels.

2. Three transfer points in the runway provide the means to shift support of the crane automatically from large to small, or small to large, wheels. At the transfer points, one rail in line with one set of wheels (larger outside wheels, for instance) ends and another rail begins, in line with the other set of wheels (smaller inside wheels, in this example). At these break points the rails overlap and run parallel a distance of 3 feet for safety.

Inside the building, the runway is straight. Here the four larger wheels ride the rails. Since all four wheels are the same diameter, the crane travels straight.

At the end of the building the runway begins to curve to the left. A transfer point in the left rail (looking toward the end of the yard) only changes the track from the two larger to the two smaller wheels on that end of the crane bridge. The opposite end of the crane bridge still rides on the larger wheels. All wheels revolve at the same rate. The larger wheels travel a little farther in each revolution. So the end of the crane riding on the larger wheels moves ahead of the end on the smaller wheels and the crane curves left.

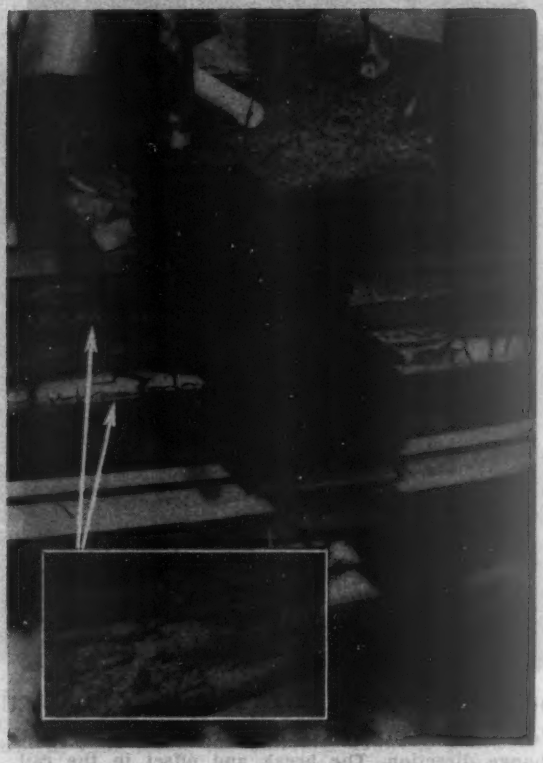
At the end of this first curved section, past the halfway mark, a second transfer point puts the left-hand rail under the large wheels again. Once more, as the crane moves in a straight line, through a 20-ft. tangent section, it travels on four wheels of the same size.

At the end of this straight section, a transfer point in the right-hand rail (still looking away from the building) shifts support of the crane to the smaller wheels on that end of the bridge. Now the crane curves toward the right—to the end of the runway.

There's no manual switching or stopping. The operator controls the crane just as though it were on a straight-way. The wheels and transfer points take care of the curves—automatically.

TAKE A LOOK AT THESE TESTS AND CONVINCE YOURSELF OF

BEAM TEST · Above, two 4-in., 7.7-lb. I-beams, coated with heat-retardant paint, and an uncoated beam are weighted with 300 pounds of steel plate.



AFTER TEST · The coated I-beams (rear) look bad but are not deflected. The uncoated beam has been deflected 2 11/16 inches. In tests, the bare beam reached a temperature of 1000 degrees F. after 4 minutes' exposure to flame. The coated beams reached 950 degrees only after 28 minutes' exposure. The charred appearance of the coated beams is the insulating coating of heat-retardant paint. The coating reached a thickness of 1 inch during the tests. The inset photograph shows a portion on the coated beam covered with the blanket of puffed heat-retardant paint.

WOOD TEST · Both coated and uncoated wood houses, identical in construction, were subjected to constant-temperature fires. Houses were 4x4x8 feet, had galvanized metal-clad wood-frame doors. Each house was placed on a metal grate over an oil-burning pit. The uncoated house (foreground) was completely enveloped by flame after 6 minutes' exposure. In the same time, walls of the coated house were barely warm — observers could hold their hands against the outside walls. The uncoated house collapsed after 12 minutes, 20 seconds exposure to flame. It was 60% consumed. Fires were extinguished after 13½ minutes. The coated house was still undamaged. Inside walls were covered with puffed coating. The under wall was undamaged. Outside coating did not puff.

PIPE TEST · This test simulated fire exposure to transfer pipe lines and pipe racks where liquid or vapor is contained. After 7 minutes exposure, uncoated, 3-in., air-filled pipe (front) has sagged about 12 inches. Similar coated pipe (second from front) remains intact, although after 25 minutes' exposure it had sagged about 1¼ inches. The third pipe, uncoated, water-filled, began to vibrate from rapid steam generation after 13 minutes' exposure. Also, it bowed upward about 6 inches at the center. In a fourth water-filled but coated pipe (not visible) the water temperature in an expansion chamber connected to the pipe never exceeded 165 degrees F. A strong wind eased pressure on the rear pipes. However the fifth pipe, uncoated, sagged about 4 inches; the sixth (coated) pipe, none.

FACTORY'S maintenance editor, Carl Wyder, says about this unusually significant article:

"These data from Union Carbide & Carbon will really start the ball rolling toward much wider usage of heat-retardant paints.

"They are not a substitute for sprinkler systems or other fire-protection devices that you now have in your plant. These paints do a job that such systems are not designed to do.

"When these heat-retardant paints were first announced, I said to myself: 'This just isn't so. Nobody can tell me a few flimsy coats of paint will protect a piece of wood or metal this much.' These tests prove I was too skeptical. Every plant engineer should study this article — and put it to use."

Heat-Retardant Paints and Coatings

By JAMES J. DUGGAN • Superintendent of Fire Protection, Carbide & Carbon Chemicals Company
A Division of Union Carbide & Carbon Corporation, South Charleston, W. Va.

IF YOU PROCESS FLAMMABLE MATERIALS, more than once you must have asked yourself questions like these:

- Is there a feasible and economical way to protect the load-bearing steel structures and equipment in the processing areas from serious damage and resultant downtime caused by fires?
- How can structures, vessels containing flammable liquids, and machinery be protected from exposure to intense heat during that first critical 15 minutes which is required to bring full firefighting equipment into play in an industrial plant?
- Are the newly developed heat-retardant coatings the answer? Will such coatings delay the collapse of structures and pipelines or the overheating of containers of flammable materials for a sufficient time to control or extinguish the fire and prevent its spread by additional spillage?

We asked such questions of ourselves for some time. In an attempt to find an answer to some of these questions, our Fire Research Laboratory recently undertook a project of major field tests on several heat-retardant coatings.

We already knew the ability of such coatings to limit flame spread and delay ignition of wood and other Class "A" combustibles. This had already been determined and documented by authorized laboratories. The published data on their tests are considered basic. But the fire-resistive requirements for *non-combustible* materials are quite different.

There are numerous chemical compounds in the form of coatings and penetrants that will make porous, combustible solids fire-resistive through their non-combustible characteristics. But we soon dicovered that on *non-combustible surfaces*, such as steel, these protective coatings must take the form of heat-insulating media. In other words, to be effective they must prevent the steel surface from absorbing heat at a high rate.

This is an important distinction. Many coatings now classified as fire-resistant may be excellent on Class "A" combustibles; but unless they also have an insulating value, they are of little or no use on steel surfaces. In our opinion, all so-called fire-resistive coatings might better be classified by their qualities, such as *flame-* or *fire-resistant* coatings for Class "A" combustibles, or as *heat-retardant* coatings for steel surfaces.

Since our research project was aimed only at discovering whether or not these heat-retardant coatings would protect structures and equipment, we decided to simplify our research by confining our severe tests to three heat-retardant coatings that seemed worthy of consideration. Preliminary tests showed that these coatings had a pronounced insulating property. When exposed to temperatures of from 350 degrees F. to 500 degrees F. each coating puffed up into a sponge-like carbonaceous mat, in many cases as much as 50 times its original thickness.

This mat or blanket proved to have high insulating value and thus it retarded the heat input into the surface to be protected. Some other coatings we examined did not have this heat-insulating characteristic. So while they might be satisfactory as *fire or flame retardants*, they did not qualify as *heat retardants*.

We want to make clear that we did not make comparative tests of all the various products manufactured for the purpose, since this was not the goal of our research. Also, we found from our tests that there still remain to be worked out some practical problems of application of these heat-retardant coatings.

Turn the page

How the tests were made

SET-UP • We made fire tests on identical uncoated and coated objects. Where possible, simultaneous tests were conducted. All, however, were under duplicate controlled conditions, in order that the true value of the heat-retardant coating could be determined.

FUEL • The fuel used for all test fires was a waste oil having burning characteristics comparable to those of gasoline. Actually, the heat was even greater than that of gasoline fires.

In each test we placed the test object over a water-filled pit into which fuel was continuously pumped below the surface of the water. This proved to be most effective, as it resulted in fuel distribution over the predetermined fire area. Also, we could control the fuel to give any degree of heat input or exposure desired. The fuel, of course, burned instantly as it reached the surface of the water in the pit.

COATINGS • All coated metal surfaces tested were first cleaned with a wire brush. Regular prime coats were applied by brush or spray, using either an oil-base zinc chromate primer or a plastic-base Paladin primer. We then applied the heat-retardant coating in one, two, or three coats, depending on the degree of protection desired, to determine the efficiency of multiple coatings. This coating is an oil-base washable coating developed for exterior exposures.

Wood surfaces were prime coated, by brush or spray, with a mixture of oil-base gray (four parts), raw linseed oil (one part), and turpentine (one part). For a heat-retardant coating we used a non-washable water-base coating for the interior of the wooden structure and an oil-base coating on the exterior surfaces.

What the tests showed

After an evaluation of our comprehensive data, the following general conclusions were evident:

1. Heat-retardant coatings of the type tested will increase the fire resistance of all types of steel surfaces and will extend their fire-safe period to a marked degree.

2. Fire-retardant paint of the type tested on combustible wood surfaces will retard flame spread and increased their fire-safe period.

3. These extensions of the fire-safe periods are long enough to bring fire-extinguishing systems and equipment into action before serious damage occurs to the structures or surfaces.

The following test results were the basis for these conclusions:

1. A bare 4-in. beam was heated to 1000 degrees F. after only 4 minutes of fire exposure, whereas a similar beam, coated, reached a temperature of only 950 degrees F. in 28 minutes.

2. A bare 2-in. channel tank leg failed in about half the time of a similar coated leg.

3. A 3-in., uncoated, air-filled pipe (standard) sagged 12⅝ inches on a 19-ft. span in 26 minutes' exposure to fire. A similar coated pipe sagged 1¼ inches as a result of the same fire.

4. A standard 55-gal. uncoated steel shipping drum containing an explosive compound failed from internal ignition after 2 minutes and 55 seconds of fire exposure. An identical coated drum withstood the same fire exposure for 9 minutes and 17 seconds and failed from excessive internal pressure.

5. An uncoated wood house with a metal-clad, wood-framed door collapsed and was consumed completely after 12 minutes and 20 seconds exposure to a continuously burning oil fire. A duplicate structure coated inside and outside withstood the same exposure without damage.

6. An uncoated steel plate (16 gage) reached a temperature of 1000 degrees F. in 2 minutes and 40 seconds when placed over a standard gas burner. A coated plate took from 16 to 30 minutes to reach the same temperature.

Requirements of a good heat-retardant coating

The problem of protection of plant structures and equipment against exposure to fire, as authorities will agree, narrows down to these principal factors:

1. Unprotected load-bearing steel will collapse at a temperature of about 1100 degrees F.

2. Under direct fire exposure, such steel will reach the failure point in from 5 to 10 minutes, as the high thermal conductivity of steel is favorable to rapid heat absorption.

3. Direct exposure to fire can cause serious damage to all types of non-combustible construction within a few minutes, although such materials as concrete, brick, etc., may have a useful fire-resistive period of as much as 6 to 8 hours.

4. It requires a minimum of 15 minutes to bring portable manual firefighting apparatus into action.

From these premises arise the following requirements for a satisfactory heat-retardant coating:

1. It should be heat-resistant to the extent that a coated surface of load-bearing steel will not reach a temperature of 1000 degrees F. under continuous fire exposure in a period of less than 15 minutes.

2. It should have proper bonding characteristics for the protection of such steel surfaces under ordinary atmospheric conditions.

3. Its application should not require special treatment of the steel surfaces. If possible, it should be

applicable to existing painted surfaces or in combination with ordinary paints without affecting the heat-resistant efficiency.

Summary of fire tests

We made four series of tests, covering the four main types of structures in our plants. They included:

1. Structural steel beams, tank supports, and standard steel pipe.
2. Standard shipping containers (ICC 5A drums).
3. Wood structures.
4. Steel plates.

It is not possible in the space allowed to summarize all these tests. Our complete report on this test project filled 112 pages, some 90 pages of which contained actual test data and photographs. The following are just the highlights of the entire series of tests that have proved the value of heat-retardant coatings on plant structures and equipment.

TEST SERIES X—Steel structural members

- In the non-destructive tests all coated members successfully withstood a fire exposure of 26 and 28 minutes without deformation. The uncoated member was deformed 2 11/16 inches.
- The coating retarded the average heat input (absorption) of the coated beam 73%, as compared to the bare beam, over the full exposure time.
- The destructive tests showed failure times of the coated beams from 12 minutes, 30 seconds, to 26 minutes. Failure temperatures varied from 1355 to 1535 degrees F. These figures compare with uncoated beams where failures occurred between 6 minutes, 45 seconds, and 12 minutes, 30 seconds, at temperatures varying from 1375 to 1535 degrees F. These higher failure temperatures are due primarily to the fact that the steel was not loaded to the maximum allowable limit. In that case it would fail at about 1100 degrees F. under the same exposure.

TEST SERIES I-E—Steel pipe, empty and water-filled

- Failure of the uncoated empty pipes was immediately apparent. One pipe deflected 12⅝ inches during the exposure period. The coated empty pipes all withstood the fire exposure without damage.
- An uncoated pipe filled with water was severely distorted during the fire exposure. The water in a connected expansion chamber was boiling violently after 13 minutes' exposure.
- A coated pipe filled with water withstood the full test of 26 minutes successfully. The maximum water temperature over the entire test period was 165 degrees F.

TEST SERIES II—Steel shipping containers

- In all tests of containers without some heat-retardant medium to protect the bare surfaces, the contents (an unstable and explosive liquid) were ignited. The shell in vapor phase reached the ignition temperature of 1040 degrees F. in less than 10 minutes, and exploded internally. This happened before vent devices could discharge the contents or reduce the pressure to atmospheric.
- Coated containers withstood the full exposure *without internal ignition*, in all cases.
- In a destructive test (no vents) an uncoated container exploded in 2 minutes, 55 seconds at 65 psi., probably because the contents reached the unstable vapor phase of 1040 degrees F.
- In a similar test, a coated drum withstood full fire exposure for 9 minutes, 17 seconds before failure caused by excessive internal pressure. Rupture occurred at a pressure of 200 psi. Since this type of drum will ordinarily fail at about 80 pounds hydrostatic pressure, we deduce the coating held the shell at a temperature somewhat below 1040 degrees F. And since it has been determined that load-bearing steel is 25% stronger at 550 degrees F. than at 60 degrees, we suspect this same rule holds true as to the strength of shell plates in tanks and containers at advanced temperatures.

SERIES III—Wood structure with steel-clad doors

- Up to this time there were no known data on coated structures exposed to constant-temperature, continuously burning fires. In this test a coated and an uncoated combustible structure were exposed to an oil fire of constant intensity.
- The coating prevented ignition of one structure, while the uncoated structure was completely consumed by fire.
- The uncoated metal-clad door was badly distorted and rendered useless.
- The coated door was undamaged.

SERIES IV—Steel flat plates

- Coated and uncoated 16-page steel plates, 14 inches square, were exposed over gas jets.
- In every test the temperature of the coated plates remained appreciably lower than the bare plates.

Basic conclusions

On the basis of the detailed test data we arrived at some general conclusions to guide our policies of fire protection.

A. These tests warrant consideration of heat-retardant coatings on all types of structural steel fire-resistant and non-combustible construction. Coatings should be particularly adaptable to portable steel structures, metal-clad doors, and such.

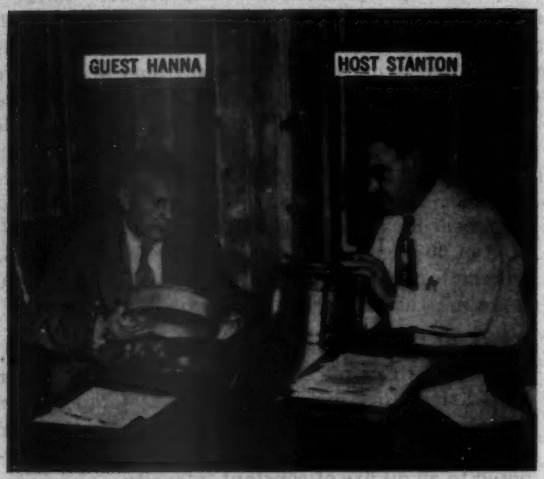
B. Where insulation covering of exposed pipelines containing flammable liquids or gases is not practical, the use of heat-retardant coatings will extend the useful fire-resistance period for a practical period of time to permit either extinguishment or control of the fire.

C. Steel shipping containers properly coated would get extended fire resistance. Also, if containers are equipped with adequate vent devices, the combination would be a valuable safety measure. It would result in retarded heat input, lower metal shell temperatures, and reduced internal pressures

D. Heat-retardant coatings are effective on combustible structures. They should be required.

CAMERA TOUR

ORAN COMPANY, COLUMBUS, OHIO



DESIGN 1 **Host Stanton** • I'll start with a short-cut we're proud of. As you know, we make floor furnaces for homes. That's the connection collar you're holding. This is the burner pot. We don't make these two parts. It's cheaper and better to buy 'em. But we designed them so they could be made from the same die — a deep draw for the pot, a shallow draw for the collar.

Guest Hanna • Must save you real money.

Host Stanton • Yes — and improves the product.

Just a Little Plant With Big-Plant Ideas

"LITTLE, BUT OH, MY!" cracked FACTORY's Field Editor Bob Dilley after visiting the Oran Company's plant in Columbus.

Here, it's plain, is just that rare small plant that doesn't let lack of size stop it from doing the things big plants do.

Case in point is the 400-ton press pictured on page 107. It's your proof that Oran stops at nothing in the way of new equipment—provided it pays off in a hurry.

This Camera Tour highlights a handful of ideas that Oran people have put to work. W. G. Stanton, assistant to the president, is your host. You'll take the tour with Guest Executive Walter C. Hanna, president, Hanna Paint Company and Hanna Industrial Finishes Company, Columbus.

FINISHING 2 **Host Stanton** • You're a paint expert—how do you like the way we paint our floor grills? We paint one side in that far booth (left). Then, without changing its position on the chain conveyor, we move it through the second booth. There the other side gets a coat of paint. To do this, we simply faced the booths in opposite directions.

Guest Hanna • Looks as if you have enough space in each booth for another sprayer.

WELDING 4 **Host Stanton** • Here's a pretty nice spot-welding operation. Here we put the ends in our heat exchanger. This jig holds the tube. It's pivoted. When one end is finished, the welder pulls a lock pin, and swings the whole thing 180 degrees. Then he welds the other end. It didn't cost us much. And sure saves a lot of time.

Guest Hanna • What kind of welder is he using?

Host Stanton • Gun type. He just zips around the four sides. Keeps the gun under his arm. A counterbalanced wheel above him holds the weight.

Host Stanton • Right, Walter. We can put another sprayer in each booth if production demands it. Also, we can speed up the conveyor a bit as our volume grows. As you can see, these are water-wash booths. They have a forced exhaust system—which means added protection of the workers. It makes a really clean spray-painting set-up.

Guest Hanna • Not only a clean paint set-up, but also a clean plant throughout, I'd say.

Host Stanton • That's something we insist on.

Guest Hanna • Now let me see your drying oven.

3 **Host Stanton** • This is our oven. When we bought it, we were buying for the future. It's an infra-red 20-footer.

Guest Hanna • How many lamps in there?

Host Stanton • About 300, each 375 watts. Take a look inside. See how clean the air is. Two exhaust ducts remove heat and fumes.

Guest Hanna • How long do the grills stay in?

Host Stanton • About 10 minutes. We can change drying time simply by changing the speed of the conveyor. It has a variable-speed drive.

More on next page ⟶

5 **Host Stanton** • Here's another spot welder. We used to use it on the operation you just saw. That was before we got the new gun. After that, we set up this welder to process the furnace casings.

Guest Hanna • That trick of working through a hole (arrow) in the table looks pretty neat. Do you save anything by doing it that way?

Host Stanton • Sure we do. It gives the workers a real surface on which to work. It takes a lot of the back-breaking work out of the job. And it speeds the rate of production. That's important. Incidentally, while we're talking about speed, look over here at *this* welding operation.

6 **Guest Hanna** • Now that's a smooth welding job.

Host Stanton • We think so. Matter of fact, we just invested $10,000 in this seam welder. We used to spot-weld the side seams on these air tubes. Now we roll-weld them. This short length of skate-wheel conveyor both positions and carries the heat exchanger through the operation.

Guest Hanna • What did you do before this?

Host Stanton • Industrial engineering's my specialty. Taught it at Ohio State. And I hold a professional engineer's license. I've done some consulting work, too. But I wanted a job where I could make good engineering practice pay off. This is it.

ASSEMBLY 7

Host Stanton · Here's a $45 jig that saves us a couple of thousand dollars a year in our burner assembly. The jig holds the burner pot and six washer-head bolts. Then we put a gasket on and lower the air-tube assembly. Next our assembler adds six nuts and draws them tight with an air wrench. The tricky part is this: We depend on the friction to eliminate the need for holding the bolt with a screwdriver while the nut is being drawn down tight. So, instead of being an awkward 2-man job, it's now a simple 1-man job.

ORAN CAMERA TOUR . . . *Begins on page 104*

FABRICATION 9

Plant Manager Boss · I'm really nuts about this Whistler press, Mr. Hanna. It would take $50,000 worth of dies and several punchpresses to replace it. In 30 minutes we can do a complete switch from one job to another. And we're already running something like 50 different parts on it.

Guest Hanna · What does it do?

Plant Manager Boss · All our stuff is sheetmetal. So we stock several hundred small dies for punching and dimpling. Normally, two men work at the press. They can set it up to do three or four operations in sequence. On this present job, I think it's making 17 holes and dimples.

Guest Hanna · Any limitations?

Plant Manager Boss · Sure. It can't make two holes right close together unless you have special dies, or do it in two steps. But it's a whiz.

10 **Plant Manager Boss** · Here are two little things we're doing to speed production and keep costs down. We took a regular lathe chuck and milled some notches in it so we can chuck up a part inside or outside. The part he's got in there now is the lighting-door frame for our furnace. We can also chuck up the door that fits this frame and face it on the lathe. Cost us $17 to modify the chuck. And now we can do these two facing operations for just about one-fifth the price an outside contractor would sock us.

8 **Guest Hanna** · This looks like the last assembly step.

Host Stanton · Just about. They are lowering the whole burner assembly into its case. An electric hoist makes it an easy job. Note, the casting rests in the bottom of the carton it will be shipped in. And the carton bottom rests on a dolly. Now, as soon as the furnace is completely assembled, they'll put the rest of the carton around it. Then they roll it to another station where it's steel strapped. After strapping, it moves to our shipping conveyor. Now come over here. I want John Boss, our plant manager, to show you some things and explain them.

More on next page

11 **Guest Hanna** · My gosh! What do you think you're doing with this baby?

Host Stanton · It's a whopper, all right. There aren't many presses like it. And they're mighty rare in plants the size of ours. But we're glad we have one of the few. We use it to draw parts for one of our furnaces. Just listen to some statistics on this press: Capacity, 400 tons. Travel, 48 inches. Die cushion capacity, 100 tons. Four blanking hold-down rams with a total capacity of 200 tons. Bolster plate, 48x60 inches. Daylight, 78 inches.

Guest Hanna · Sure sounds wonderful. But I don't see what in the world made you want all this capacity.

Host Stanton · Walt, you must sense by now that Kelly [Oran's president] doesn't buy things that won't pay off in a hurry. Even at present production rates, that press will pay for itself in about five years. My guess is, we'll get our money back a lot quicker than that. Best part is that we can get our combustion chamber and heat exchanger heads made when we need them. We're not at the mercy of a sub-contractor to get them to us when he gets good and ready.

PLANT SERVICES 12 **Guest Hanna** · Is this boiler room planned to fit all your possible future plant needs?

Host Stanton · You bet. We have two boilers, one rated at 40 horse and the other at 100. The larger one is our stand-by boiler in summer. It runs at about 60 horsepower in winter. We keep the smaller one going most of the time. The stand-by burns oil. But the small one can burn either gas or oil, and can be switched over in an instant. Both of these boilers are equipped with electric-eye shut-offs.

Guest Hanna · What do they do?

Host Stanton · A photo-electric cell on each boiler watches the flame. As long as there's any fire, the fuel valve stays open. If the flame goes out, the electric eye detects it and throws a relay that turns off the fuel supply and sounds a loud buzzer signal. That means something is wrong, so somebody comes a-runnin'. Another thing—on our oil tank we have a pump to keep the heavy oil circulating. Keeps our fuel lines from plugging up.

ORAN CAMERA TOUR . . . *Begins on page 104*

13 **Guest Hanna** · You're wired for the future, too?

Host Stanton · Sure. We buy primary power at 13,000 volts and cut it to 440 volts through our 500-kva. transformer. Dry-type transformers take part of it down to 110/220 volts for lighting, small motors, hand tools, and the like. We can double our power use and buy only new circuit boxes and lines.

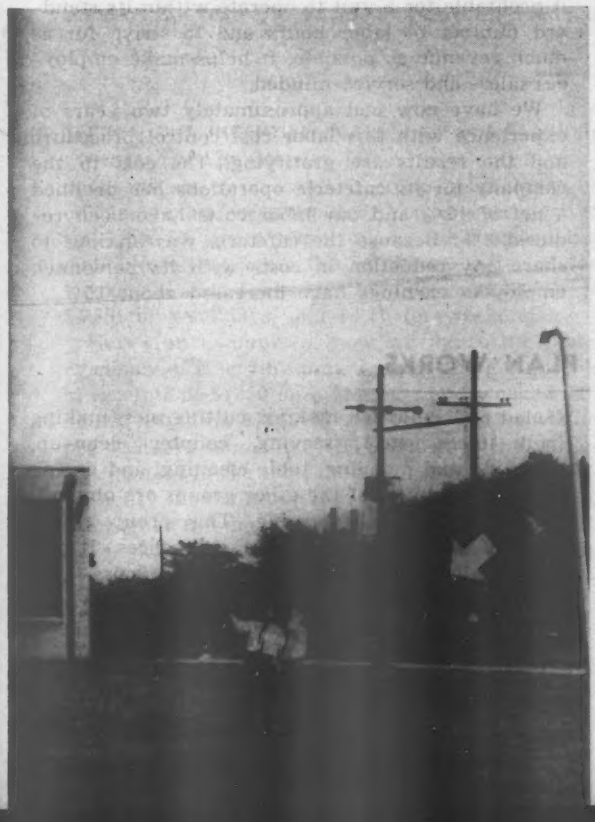
Guest Hanna · Who does your plant maintenance?

Host Stanton · Just two men. One's a licensed steam engineer. The other's a Class-A millwright.

14 **Guest Hanna** · Do you manage to get all your water from this one well?

Host Stanton · No. We just had a city line put in. It supplies us with drinking water and boiler make-up water. But this 120-ft. well is our major source. We pump untreated water for process and cooling. Even so, we're stingy with it. For example, we pump water to the degreaser and welding machines for cooling. We use the same water in the rinse tanks of the bonderizer. After we get all we can out of it, and not before, it goes into the sewer.

End



EXPANSION

15 **Guest Hanna** · We've been talking about expansion. Just how do you plan to expand your plant? I assume you've got it all figured out.

Host Stanton · Our first expansion will be off there to the south, and where we just bought land on the north. We can expand about 100% on this property. And we're dickering for additional parcels of adjoining land. Ultimately, we can get pretty big on this site. Our plant services are in shape to grow. That transformer (arrow) behind you will easily stand 100% expansion. We're handling some defense contracts right now, so expansion could be necessary almost any minute.

Guest Hanna · Thanks for the tour, Stan. I've garage or something like that?

Host Stanton · Yes. We took over a truck garage after World War II. Then we added a big section to it in 1948. Fortunately, the buildings we already have are pretty good structures.

Gust Hanna · Thanks for the tour, Stan. I've picked up some furnace ideas that I can put to work in the paint business.

Host Stanton · Swell. And don't be surprised if I drop in to see you soon. I ought to get as many ideas out of your plant as you've got out of mine.

Here's an Incentive Plan That Cuts Cafeteria Losses

Losing money on your cafeteria? If so, you may find a way out in this unusual wage incentive plan. It has helped Eastman Kodak to cut its losses, and improve its service. The trick is the ingenious unit of work measurement the company uses. Here's how they do it—all the information you need to put the plan to work.

By E. C. WEIRICK • Industrial Engineering Division, and
G. S. MacKAY • Industrial Relations Department, Kodak Park Works,
Eastman Kodak Company, Rochester, N. Y.

BECAUSE OF THE NATURE OF OPERATIONS at Kodak Park Works, a plant covering 400 acres, it has been necessary to de-centralize and expand the in-plant feeding service more and more. Today there are eleven cafeteria serving units located throughout the plant, all of which draw provisions from a central kitchen, bakery, and stockroom.

As the cafeteria service expanded, the cost of operations increased, until in 1947 it was decided to study the situation to determine if food service expenses could be reduced. A cost-control program was instituted. As a result of the combined efforts of the cafeteria personnel, the Industrial Engineering, Accounting, and Industrial Relations Departments, we were able, within two years, to substantially reduce the operating deficit. We were able to maintain and even improve service.

Although this was a substantial gain, we were not convinced that no further gains could be achieved. Consequently, further study was given to the project, with the result tthat a plan was devised which gives us a better utilization of labor and an effective control of labor costs.

The plan is simple, easy to understand, easy to administer, and is one which establishes a standard number of labor hours to operate a given unit. These standard labor hours are tied in with cafeteria revenue so that the efficiency of a unit is expressed in terms of revenue per labor hour. In other words, the greater the revenue per labor hour, the greater the efficiency. And the greater the efficiency, the greater the employees' earnings.

The employee's weekly pay check is determined by the revenue per labor hour for the unit in which he works. However, no employee can earn less than he did prior to the inception of this plan.

Putting the emphasis on revenue per labor hour is what gives the plan its effectiveness. It makes it profitable for a unit to operate within its standard number of labor hours and to strive for as much revenue as possible. It helps make employees sales- and service-minded.

We have now had approximately two years of experience with this labor cost control procedure and the results are gratifying. The cost to the company for its cafeteria operations has declined a net of 12% and our labor costs have been reduced 8%. Because the cafeteria was anxious to share any reduction in costs with its personnel, employees earnings have increased about 15%.

HOW THE INCENTIVE PLAN WORKS . . .

1 THE GROUPS • To make the plan manageable, we divided the cafeteria into groups of "work units." These were natural operating units, following the usual functional breakdown of cafeteria work: the eleven serving units, the kitchen unit, butcher shop and bakery unit, dishroom unit, and general cleaning unit.

Each serving unit is responsible for the following: counter set-up, secondary food preparation (salad and sandwich making, cutting pies, making fruit juices, etc.), serving, counter clean-up, sweeping and mopping, table cleaning, and busing dishes. The duties of the other groups are obvious, except for general cleaning. This group cleans walls, windows, ceilings, halls, and offices. It also periodically power-scrubs and waxes floors.

The plan applies to each group independently, and earnings are figured independently for each.

2 MEASURING STANDARD LABOR HOURS · The standard labor hours in the chart on the right will give you an idea of the way we set up our facts. These figures are part of the data compiled for a single serving unit. Notice that we took account of differences in labor requirements for weekdays and weekends.

Because of the size of our cafeteria operations, we devoted about eight months to analyzing the work done by each group. Naturally, this would be a much simpler and shorter job for a plant that has only a single serving unit.

We studied each job over a period of weeks to measure the standard labor requirements. Then the times for each job were added to get the total standard labor hours for each group. At the same time, improvement in methods was effected wherever possible.

Standard Labor Hours

FIRST FLOOR SERVING UNIT, BUILDING 28

	OPERATION	Standard Labor Hours Mon.-Fri.	Sat.	Sun.
1	Sandwich preparation	9.7	4.3	2.3
2	Salad and cold plate preparation	9.5	3.4	2.7
3	Check in and cut pies	3.8	1.0	1.0
4	Check in and cut baked goods	1.0	0.6	0.5
5	Make up butter patties	1.0	0.2	0.2
6	Make iced tea	1.3	0.9	0.4
7	Supply condiments and silver	4.5	0.8	0.8
8	Operate line No. 1 (10:30-1:30)	33.5	16.5	14.5
9	Bus dishes, clean tables, vacuum, mop	48.5	6.2	6.2
10	Supply clean dishes to line	0.7	0.3	0.3

3 MEASURING STANDARD REVENUE PER LABOR HOUR · It is obvious that standard labor hours don't mean much by themselves. They fluctuate in relation to the volume of business. It early became obvious that revenue represented the best measure of the work. However, we also recognized that any changes in selling prices would require an adjustment in the Revenue Index. So we used revenue to measure business volume, and worked up "standard revenue" figures to parallel our standard labor hours. To get accurate figures, we averaged the data for 25 representative weeks.

For example (see chart at right), in one serving unit the standard revenue was $1195 daily, Monday through Friday, and $640 for Saturday and Sunday. Converted to an hourly basis, the revenue per standard labor hour was $4.98 on weekdays and $4.10 on weekends. This is illustrated in the table above.

Summary Table—Revenue Per Standard Labor Hour

FIRST FLOOR SERVING UNIT, BUILDING 28

Day of Week	Standard Labor Hours	Standard Revenue	Revenue Per Standard Labor Hour
Monday	240	$1195	$4.98
Tuesday	240	1195	4.98
Wednesday	240	1195	4.98
Thursday	240	1195	4.98
Friday	240	1195	4.98
Saturday & Sunday	155	640	4.10

4 SETTING THE INCENTIVE SCALE · After defining an average day's business in labor hours and in revenue, we set up a scale, so group percentages of efficiency could be computed. You can see part of the scale for one serving unit in the chart on the right. Note that again the figures are different for weekdays and weekends. In this case, 100% is $4.98 for weekdays, and $4.10 for weekends.

Here's an example of how we figure the labor efficiency of a serving unit. Assume the group took in receipts of $1250 on a Monday, and worked 240 hours. Dividing $1250 by 240 gives $5.21 revenue per standard labor hour. If you look at the weekday column in the table, you will find this is 103% efficiency for the group. The higher the percentage, the higher the employee's earnings.

For kitchen and bakery calculations, we use over-all revenue from all serving areas, excluding items (milk, bread, etc.) not prepared in this unit.

Computation Table—Group Efficiency Percentages

FIRST FLOOR SERVING UNIT, BUILDING 28

% Effectiveness	Revenue Per Standard Labor Hour Week days	Week ends
104%	$5.30	$4.42
103	5.22	4.34
102	5.14	4.26
101	5.06	4.18
100	4.98	4.10
99	4.90	4.02
98	4.82	3.94
97	4.74	3.88
96	4.66	3.80

More on next page

5 **OPERATING POLICIES** · To stimulate continued interest in what's happening, we figure the effectiveness and post the results daily. This has worked well in practice. One evidence of the interest is the speed with which we get questions when occasionally daily postings aren't right on time.

Of course, we also guarantee base earnings so that no employee's earnings can go below his prevailing rate prior to the inception of this new plan.

We keep employees fully informed of everything that goes on. At the outset, we held meetings to explain what we were planning to do. As work went on, we consulted with them on methods improvements, and conducted training sessions to make sure everyone knew just what the new methods were.

TO SUM UP · As a result, the operating deficit of the cafeterias has been reduced and the cafeteria personnel share in this reduction through increased earnings. We have also experienced the following advantages: (1) more accurate scheduling of work, (2) better utilization of labor and facilities, (3) improvement in quality of service.

Management recognizes its responsibility to continually seek ways and means for improving the in-plant feeding operation, from the point of view of service to our people and also operating cost. We believe we have in this plan an effective device for controlling one of the more important, if not the most important, element—cost.

How You Can Raise White-Collar Salaries

PLANT OPERATING MEN have a pretty good idea now what they can pay white-collar workers—from top executives down to the professional, technical, and administrative help—without running afoul of stabilization rules.

Some guides have been laid down by the Salary Stabilization Board, which controls salaries of all persons who are paid a salary —those who do not have a union and are not covered by federal wage-hour law.

- First off, if you haven't already done so, you can pay them 10% above what they were getting in January, 1950, right now. This is the "catch-up" formula you've heard so much about.
- Then, if you dished out a profit sharing, Christmas, or some other kind of year-end bonus last year, you can do it again this year. But you can't increase the amount of the bonus.
- If you have an approved escalator adjustment plan tied to the cost of living, you can continue to use it.
- And SSB has just announced that you can keep on making the kind of salary adjustment most common in white-collar groups—the individual salary hike based on merit or length of service.

This SSB Regulation No. 3 is permissive and, luckily, lets you make the adjustments without first getting the government's OK.

All you have to do—if you make the salary boost within the limits—is keep records for three years for possible future inspection. You can ask for approval for any raises outside the approved limit, but be prepared for a long wait for the OK.

Figuring the merit or length of service increases you can make without asking government approval boils down to three don'ts:

1. The average of all merit increases in the calendar year can't exceed 6% of the group payroll involved, even though long-standing practice has been for more.

2. Where salary ranges are used, no employee's salary may pierce the range ceiling. The top guy's stuck, unless you promote him.

3. Where there are no salary ranges, and thus no ceiling, no employee can get more than 10% in merit raises a year.

If you have salary ranges, here are your options:

1. Past practice. You may grant in merit increases the same percentage of the payroll you granted last year. Remember, not more than 6% average, and no one through the ceiling.

2. Six percent option. You can give merit increases up to an average of 6%.

3. Established-plan option. You may follow any plan you had in writing on the "freeze" date, January 25. If the 6% option is more, you can take it.

Remember: Merit increases are permitted over and above the 10% "catch-up" covering cost-of-living rise during 1950.

SSB will soon come out soon with a regulation permitting you to raise base salaries to reflect the cost-of-living rise since January, 1951.

Will Defense Production Be Caught in the Squeeze?

When Congress revised and extended the Defense Production Act, it relaxed a squeeze on business profits.

President Truman asserted that this action by Congress cripples the government in its effort to prevent inflation which, as he puts it, could lead to "enrichment and profiteering for the few, economic hardship and misery for the many."

He asked Congress to rescind its action.

This editorial—the second on problems presented by "escalator" clauses—aims to throw some light on this conflict of opinion.

The Squeeze

The squeeze on profits was imposed in the name of price stabilization. The idea behind it was simple. The *selling prices* of industrial products were to be held under a tight lid. But many industrial costs are affected by "escalator" clauses of one kind or another which tend to boost production *costs*. Thus, with rising costs and fixed prices, profits would be squeezed and much of the cost of defense would thereby be shifted from those favored by escalator clauses to business concerns.

The mechanics of this squeeze on profits were complicated. But here, in brief, is how it was to work. The first step was to require manufacturers to set ceiling prices, effective May 28, for their products.

These ceiling or maximum prices were to allow for increases in manufacturers' costs that had occurred since Korea. *But they did not allow for all increases.* Manufacturers, for example, could not include increases in indirect costs—office or selling costs. Neither could they, in calculating their new prices, include increases in the costs of materials or direct labor that had come after March 15. This was the first phase of the squeeze on profits.

The second phase was prepared by not putting a ceiling on costs. The Wage Stabilization Board said it could not disturb the operation of "escalator" clauses by which wage rates are geared to the cost of living. Moreover, nothing could be done to curb the operation of the farmers' "escalator" clause, the farm parity arrangement. Under it, the federal government underwrites higher prices for farm products to match increases in the cost of things farmers buy. So this left wages and many materials costs free to rise against a ceiling imposed on the prices of what industry has to sell.

Relief—at a Loss

On two conditions only would the Office of Price Stabilization permit a company to raise its prices and escape this squeeze. One of these was that increased costs had more than wiped out its profits; in other words, that it was operating at a loss. The other condition was

that the industry of which the company is a part was not, as a whole, making "excess profits." That is, the industry, as a whole, could not get price relief if its overall profits before taxes were greater than 85 percent of its average profits during the best three of the four years from 1946 through 1949. Many companies expected that their profits would be cut drastically before they could get through this narrow escape hatch.

When this squeeze on profits was set up, we were told that industry as a whole was reporting record profits. But, it was equally true that wage rates and farm prices also were at record high levels. And it was also true that, under the impact of rising taxes and the dislocations caused by the defense mobilization program, profits actually were on the way down.

Profits—Going Down

By the time Congress acted to relax the squeeze, corporate profits, after taxes, were running at a rate 20 percent lower than they had been six months before. And the clear prospect was that they would continue to decline.

So the issue put up to Congress was simply this. Should business firms stand so much of the brunt of the defense costs while "escalator" clauses continued to exempt organized workers and farmers from paying their share of those costs?

But this question actually is much broader than one of fairness or unfairness alone. One certain effect of such a squeeze on profits would be to undercut the capacity of private industry to install the new plants and equipment needed for our mobilization effort. Today—unlike World War II—private industry is financing almost all of our huge program to expand production. And about two-thirds of the money that has been plowed into the expansion and improvement of our industrial machine since World War II has come out of profits.

In view of all this, Congress decided last summer to relax the pressure on profits. This was done by the controversial Capehart Amendment to the Defense Production Act. This amendment has serious administrative weaknesses. But some measure with the same purpose is needed to maintain profits at a high enough level to finance the huge and continuing expansion of our industrial machine that is now underway.

Basic Issues

As soon as the amendment was enacted, the President asked Congress to revise the law again. The heart of his proposal was to restore to the Administration the powers it used last spring to arrange the squeeze on profits outlined here.

This controversy will continue. There can be no final answer to it as long as we have the economic controls made necessary by mobilization.

But if we look beneath the surface of this technically complicated controversy, we shall see clearly that the basic issues are:

1. Whether we really shall make an effort to distribute fairly the burdens of inflation caused by our defense mobilization—

2. Whether farmers and organized workers should be exempted from these sacrifices by escalator clauses—at the expense of the nation as a whole—

3. Whether profits should be squeezed still more—at the risk of putting a fatal squeeze on the effort of industry to build new plants and install new tools. These new facilities are essential to maintaining American living standards—and they are the heart of our ability to defend ourselves and the rest of the free world.

Americans face no more important economic issues at this time.

McGraw-Hill Publishing Company, Inc.

OPERATING SHORTS

Electric Heat Melts Snow Off Runway

Materials for production keep moving, despite snow and ice in outside storage yard, because crane and transport runways are electrically heated. The South Milwaukee plant of the Bucyrus-Erie Company put lead-covered heating cable under four concrete runways. Runways are about 10 feet wide, 100 to 275 feet long. Stepdown transformers supply secondary voltages of 180 volts for the shortest runway and 500 volts for the longest. Tile drains along edge of the runways drain the melted snow.

This installation melted a week-end snowfall in a few hours, with the temperature at 11 degrees below zero.

Suspension Arm Helps Handle Kegs

A ram-type suspension arm on a fork truck cuts more than 75% off the man-hours needed to handle kegs of nickel at Whitehead Metal Products Company, Philadelphia.

The kegs weigh 500 to 800 pounds and the arm handles four at a time.

Operator positions arm over the kegs, then gets off truck to locate grip on each keg. A coil spring holds the grip in place. After kegs are stacked, operator again gets off truck to release the grips.

The suspension arm brings real savings: one man's time, more than half the travel time, and floor space, since kegs are stacked 4-high.

Metal Stitching Cuts Labor Cost 65%

One man assembles 33% more corrugated aluminum doors with metal stitching than two men did by riveting at the Tomfohr Overhead Door Company, Portland, Ore.

The stitcher forms and drives 18-gage stainless steel wire staples through more than an inch of aluminum sheet and structural member and clinches—in 1/5 of a second.

To reach the center of the 8-ft. door, the company rebuilt the stitcher, extended throat depth to 4 feet.

New method cut labor costs over 65%, fastener cost 75%. And rejections have been cut from 10%, with riveting, to 2%.

More on next page

OPERATING SHORTS ... Begins on page 113

Belt Carries Scrap From Press to Car

A conveyor belt carries scrap from a battery of nine punchpresses directly to a shear at Midland Steel Products Company, Cleveland. The belt is 236 feet long, travels 20 to 40 feet per minute, depending on how many presses are operating.

The belt is made of steel links hinged together with rods, so scrap cannot fall through.

An alligator shear, synchronized with belt speed, cuts scrap into small pieces.

A 21-ft. inclined section of the belt then carries the scrap from the shear to the railroad car, loads it automatically.

Radioactive Waves Check Thickness

A beta ray gage spots a variation of a few ten-thousandths of an inch in the thickness of rubber sheeting as it comes from the calender at Seiberling Rubber Company, Akron.

A detector picks up the radioactive waves that come through the sheeting, translates the amount into "weight per square yard," and records this weight on a graph.

The calender operator watches the graph, adjusts the machine as soon as a variation shows up.

Advantages: extreme accuracy, immediate notice of error, no wear on the material, no sampling. The radioactive material, Strontium 90, will last more than 50 years.

It'll pay you to look in the back of the magazine for . . .

. . . **catalogs you can use on your job.** "Important New Catalogs" brings you the best. **See page 135.**

. . . **equipment to make the job easier.** "What's New in Equipment" is a monthly trade show of equipment for the plant operating man. **See page 154.**

. . . **hints on labor relations.** "Significant Developments in Practical Labor Relations" isn't just for the labor relations man. It's for *all* plant operating men. **See page 222.**

. . . **tips to help solve plant engineering problems.** You'll find them in "Plant Engineering Problems." **See page 246.**

. . . **industrial news, hints, and quotes** from business leaders in "You Mustn't Miss." **See page 254.**

. . . **home reading to help you on the job.** "Books and Booklets" is a good guide to current books for the man who wants to get ahead. **See page 292.**

. . . **and others.** See table of contents on page 3.

◀ A PLANT MANAGER'S PROGRAM FOR

Maintenance Control That Really Controls

By W. C. ZINCK • Plant Manager
Arbogast & Bastian, Inc., Allentown, Pa.

If you are not satisfied with the maintenance program in your plant, this article will hit you where you live.

It was written by a production executive who has studied the maintenance problem for over 20 years.

He found early that top management needs to be sold on the benefits of good maintenance. He has thought out clearly a simple administrative program for getting good maintenance.

You as a production executive can take a leaf from his book to improve your stake in maintenance.

And *you* as a maintenance executive can use these same techniques to overcome top management's apathy to your ideas.

MY FIVE-STEP APPROACH
TO THE MAINTENANCE PROBLEM . . . . . page 116

MY TWO-FORM SYSTEM
THAT ONE MAN CAN RUN . . . . . page 118

MY WEEKLY REPORT THAT KEEPS
THE BOSS SOLD ON THE MAINTENANCE JOB page 120

MEET THE AUTHOR, "Clem" Zinck. Those of you who attended the session on "Small Plant Problems" at the Plant Maintenance Show in Cleveland will remember him well. After the session was over, many in the audience piled on the platform and swamped him with questions on maintenance administrative problems.

Biggest volume of questions centered on what was an effective plan for controlling plant maintenance that didn't need clerks. Everybody shied away from those clerical costs that make trouble when you're suggesting a plan to top management.

The little that Clem Zinck had time to say on this big question made a lot of sense. So FACTORY asked him to talk at length. He speaks with authority, we know, because he's been wrestling with this maintenance problem ever since he began his career. And that was long before he wrote his 1933 articles for FACTORY on control of maintenance.

When we asked Clem Zinck how he "got that way," he pointed to his record.

"I began my industrial work," he said, "in a railroad repair shop. I was graduated as a mechanical engineer from a cooperative college. I worked as an industrial engineer in a plant making thousands of different small articles from sheetmetal, wire, and castings. Then in a plant making a million slide fasteners a day. I have since had managerial responsibility in plants making sheetmetal products, electrical and electronic parts, sheetmetal partitions, hearing aids, automatic filling machines—and now, meat products."

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My Five-Step Approach to the Maintenance Problem

All through my industrial experience one common factor has influenced my work —plant maintenance. Whether my job had to do with design, time study, methods, production, or administration, maintenance was always an important element.

So, relatively early in the game, I decided to take the maintenance function apart to find out what makes it tick. I wanted to learn how to control it to best serve the ends of production and finance. Here's my story.

I followed the example of the Negro preacher who had earned an enviable reputation as an orator. When asked about his method, he replied: "I reads myself full. I thinks myself clear. I prays myself hot. Then I lets go!"

STEP 1 **Research of the subject of maintenance control.** I read all about maintenance in the few standard texts I could find. Then I researched the maintenance methods of various companies, as published in the technical press. I came up with an analysis of the ways to control maintenance to fit the need.

Next I studied the maintenance problem of the plant where I was working. It was a New England plant of some 1000 employees making those thousands of small articles from sheetmetal and wire. About this time I became assistant factory manager. This gave me the authority to do something about the maintenance problem that had plagued my efforts, as an industrial engineer, to lower costs and keep them lowered. This same problem was now plaguing my effort to produce quality parts on schedule.

Armed with my new authority I went to each production department foreman, to the mechanical superintendent, and to the plant engineer. I asked each one to write down every maintenance item he wanted taken care of to improve operating conditions, raise quality, and lower costs.

To overcome their ingrained what's-the-use attitude, I had to get a bit tough. I told them I'd fight for everything they put down on their lists, but I wouldn't raise a finger for anything that wasn't down. The lists straggled in. When they were checked, organized, and typed, I had a 64-page folio of maintenance work, broken down by crafts. Here was ammunition for a full-scale attack on my plant's maintenance problem.

STEP 2 **Development of the proposed maintenance system.** How could I use this information effectually? Some mighty clear thinking was needed.

To the casual eye, the plant maintenance was good—as good as you'd find in most well-operated New England plants. The mechanical and operating engineers were capable. The craftsmen were skilled, the foremen good. And management was excellent.

But why was there such a backlog of required maintenance to restore the plant to what those capable production men knew was needed and worth while? Why had the years developed a what's-the-use attitude? Why was there only enough maintenance to keep the plant on a profitable operating level, yet at a level far below what it should be for the most effective use of labor and production of best quality? Why?

The answer was that top management was not getting a clear picture of the maintenance function on which to base its far-reaching maintenance policies. I realized I had to develop a system not only to control maintenance, but also to present maintenance data to management.

The job of accumulating and presenting data always means clerical work. As an industrial engineer I had used a rough ratio of one clerk to a department of 40 workers to keep the records of a wage incentive system. So, for 25 maintenance employees I set out to develop a control system that could be handled by one clerk, part time.

I won't stop for details now. You'll find the course of my thinking, and the results, in the simple paperwork plan described on page 118. I'm satisfied today that my system is still as sound as on the day it was born. Moreover, it's a plan that can be used in the average plant today.

STEP 3 **Planning to sell the system to top management.** I knew this proposed system for getting good plant maintenance would work. Clear thinking bred that confidence. But my biggest job now faced me—

to convince the plant's top management of this fact.

Let me give you this advice. When you tackle the "sale" of a maintenance control system to top management, you've got to have a complete system ready to apply immediately upon its approval.

There are many reasons. Here are two. Every president (or management executive) worth his salt wants men who think their problems through and come up with complete programs. Also, a proposer needs to arm himself with all the correct and informative answers to the inevitable objections and knockdowns he'll get from top management in testing and probing for weaknesses.

Here's another reason. You've got a better chance of getting approval of your plan as written when you present it as an accomplished fact. It's not so easy for the one doing the approving to interject his ideas in a plan already written up and backed up by printed forms, as it is when a plan is yet to be formalized. Usually the plant executive who can approach top management has enough authority to develop a plan and get forms printed prior to disclosing it. At least, that's what I did.

Here's another pointer. A new proposal always raises the question of cost, especially if it's a new maintenance plan. To management, maintenance dollars on a profit-and-loss statement either reduce the profit or increase the loss. Therefore the deviser of maintenance control must come up with a practical yardstick for the amount of money he claims is needed.

This yardstick can be a budget, a ratio to a productive factor, a standard-hours system based on established hours allowed per job, or some other item peculiar to the manufacturing operation. It must be reasonably question-proof, and one that can be readily sold to top management. Also, it must be easily understood by maintenance men.

In my plant, productive labor had been tied for years directly to the dollar volume of incoming orders. This occurred because of the diversity of products made and the wide variety of manufacturing processes. It was logical, therefore, for one to assume that in management's mind maintenance labor had been tied directly to productive labor by force of habit. I found it so—over the years the percentage of maintenance labor to total productive labor was practically constant—7%.

The logic of the problem and its solution now became simple. If the maintenance program was insufficient—and witness the 64-page bill of particulars—it was the result of too low a budget. Obviously, then, the percentage ratio should be increased. I decided to ask for 10%, until the backlog of maintenance work was cleaned up.

STEP 4

Planning to keep management sold. How was management to know of the progress of the cleaning-up process? It needed periodic summary reports. These reports should show status of work load, maintenance payroll, allocation of costs as to type of work, and so on.

Maintenance from now on had to receive the full light of regular management scrutiny. Only in that way could management make good, sound maintenance decisions.

This function was taken care of by a weekly report, which is explained in detail on page 120.

STEP 5

Selling the maintenance control system. Now came the problem of winning top management's approval of the whole plan for better maintenance. I kept "praying myself hot" waiting for the best time to "let myself go."

It came about this way. My routine called for a weekly conference with the president. I waited until a good opportunity arose. Then I struck hard and fast. For once, my enthusiasm, facts, and carefully planned program prevented any interruption by the president to change the subject—an executive ruse at which he was an expert.

I delivered my haymaker—a request for a flat maintenance allowance of 10% of the productive payroll so as to clean up those 64 pages of maintenance work.

Now came the deluge! He grabbed the work folio and went at it with his red pencil. "You don't need this." "This is a crazy request." "We just fixed that roof three years ago." And so on.

"All right," I said. "Suppose you don't really need half those items, you still have 32 pages. And suppose your mechanical superintendent, your plant engineer, and all your production foremen are wrong on three out of four items, you still have 16 pages of back work!"

That was on a Friday afternoon. On Monday I was told to hire 10 craftsmen, increasing the maintenance force by 40%.

The new system worked. The weekly report data became the basis of all maintenance discussions and future policy.

This study dates back to a few years ago. I have since used the same approach in the solution of maintenance problems in all my plant connections, right down to today's manufacture of meat products.

You can make this technique the basis for setting up all management and maintenance controls. Fundamentally it is getting the other fellow to know what you know. To do it:

1. Marshal your facts logically.
2. Talk his language.
3. Dramatize each point by a pertinent example.

When you have made it possible for any top executive to see your problem correctly through his own eyes and in true perspective with his other problems, you can sell him on any reasonable program—even a bigger maintenance program.

For a good two-form maintenance system, turn the page

My Two-Form Maintenance System That One Man Can Run

Unless you are convinced that a good plan must have some paperwork, you'd better get religion before you try to convert the big boss. If he rants about clerical expense, prove to him that your plan is free from frills and fancies. As a clincher to your argument, ask him if *he* could get along without paperwork. If he's an efficient boss, I'm sure he's got it. And you've got him in a corner.

I believe work efficiency and "writing it down" are Siamese twins. One can't exist without the other. You can't misinterpret a written order. It fixes responsibility. And it's actually less costly in the end.

My maintenance control plan has just two forms.

MAINTENANCE AND REPAIR REQUEST NO. 7538

REQUEST NO.	DATE	NEW WORK	REPAIR	CHARGE DEPT.
173	6/7/51		✓	23

MACHINIST	BLACKSMITH	CARPENTER	PLUMBER	ELECTRICIAN
✓				

MACHINE	FLOOR NO.	BLDG. NO.	TAG NO.
SILENT CUTTER	4	1A	2

PRODUCTION HELD UP ON: ARMY VIENNA SAUSAGE

IS PRODUCTION BEHIND SCHEDULE? YES - TWO DAYS

WORK TO BE DONE — GIVE ALL DETAILS

REPAIR BROKEN BLADE AND BLADE GUARD

Joe Smith
SIGNED

ORIGINAL TO MAINTENANCE ORDER CLERK

MAINTENANCE ORDER AND JOB TICKET

WORK DONE BY		WORK TO BE DONE (If description given below does not cover give additional details to fully describe)
MACHINIST	✓	REPAIR BROKEN BLADE AND BLADE GUARD
BLACKSMITH		
CARPENTER		
PLUMBER		
ELECTRICIAN		

TYPE OF WORK		DATE OF ORDER	DATE ORDER STARTED
INSPECTION		6/7/51	
REPAIR	✓	CLOCK NO.	NAME
REPLACEMENT		PURCHASED MATERIAL	STOCK MATERIAL
NEW WORK		ORDERED ON REQ. NUMBERS	COST AS INVOICED $ ¢
WORK DONE ON			
FLOOR NO. 4			
BLDG. NO. 1A			
TAG NO. ON EQUIPMENT 2		IMPORTANT: If equipment has no tag number, write description of equipment worked on below	

1 Maintenance and Repair Request

You don't need to copy this exact form. What you do need is a formal method by which a production supervisor can get some repair work or alterations done. There are few situations so drastic that he can't take time to deliver this request to the maintenance clerk. And, if an emergency arises, a written order should follow the phone call.

The request form tells the maintenance man all he needs to know to get started right. It's made out in triplicate—original order goes to maintenance, duplicate goes to the production superintendent (to keep him posted), and triplicate stays with the originator.

2 Maintenance Order and Job Ticket

This is the work horse of maintenance control. It's made up in triplicate. I learned long ago the strategy of "make one writing do." So with these three copies you have:

1. **Original**—to general superintendent, for system control.
2. **Duplicate**—to maintenance supervisor, for work control.
3. **Triplicate**—to craftsman, for time and material control.

This form is designed to secure *all* the information about work done for cost accounting and management control purposes. There are the usual

spaces to show who did the work, the hours spent at it, and the material used. Then the accounting data are completed on the form by the items on department charged and the equipment or building worked on.

Other data on the order are for management control, as I shall bring out more fully later. These data are noted on the order by the maintenance supervisor so that a clerk can prepare the weekly maintenance control analysis. Here are some significant points on how this order gives you the control you need:

a. The elapsed time between "date of order" and "date order completed" is used to focus attention on the speed of maintenance service. This can be seen at a glance.

b. The "work done by" item is the basis for distribution of labor by crafts over the entire work

NO. 7538

work actually done, total work done	CHARGE TO DEPT NO. 23	LABOR HOURS	LABOR DATE
	EST. LABOR COST		
	EST. STOCK MATERIAL COST		
	EST. PURCHASED MATERIAL COST		
DATE ORDER COMPLETED		TOT. HRS.	LAB. COST
RATE PER HOUR			$ ¢
USED		OVERHEAD	
	@		
	@		
	@		
	@		
ORIGINAL FOR GENERAL SUPERINTENDENT		TOT. MAT. COST	
		TOTAL COST	

load to assure equally prompt service on all maintenance requests.

c. The "type of work" item is an important control, as you will see later. It permits a key breakdown as to how maintenance labor is used—i.e., to prevent trouble ("inspection"), to repair ("repair"), or to install ("replacement" or "new work"). This is essential information.

d. The "work done on" item is used to highlight and control maintenance labor cost by type of equipment or buildings.

e. The items on estimated labor and material costs inject an estimating procedure into the maintenance order routine. All work estimated over $50 in total cost must be OK'd by the general superintendent.

MAINTENANCE ORDER ROUTINE · The order routine is set up to follow the natural flow of: request—formal order — investigate — plan — work — report. You really can't label these functions as "more red tape" and make that curse stick. Everybody puts in at least that much effort, and usually more, to account for every productive labor dollar.

Stripped of all complexities, the clerical maintenance routine is this:

1. Preparation · Upon receipt of "Maintenance and Repair Request" the maintenance clerk writes up the "Maintenance Order and Job Ticket."

2. Routing · He sends the duplicate and triplicate copies to the maintenance supervisor, keeps the original in a file, by order number. The duplicate copy serves as a ledger of work to be done, and as a tickler file to schedule the work by crafts. When the job is done, you destroy this copy.

3. Approval · If an approval is needed, the supervisor estimates total cost and gets approval, or the order is cancelled.

4. Recording · As the work is done, the triplicate (a card) serves as a time ticket. If more than one craftsman is involved, each extra man uses a non-numbered ticket on which he enters the job number. If the job carries over into other weeks, each man turns in a job ticket each week.

5. Costing · At the end of each week the maintenance clerk sends all job tickets to the payroll department. This department checks total hours worked by each craftstman against his clock card. The job tickets then go to the cost clerk for extension of labor and material costs, and for totalizing. Then to the accounting department for posting. From there, back to the maintenance clerk.

6. Closing · The maintenance clerk summarizes *all* job costs on the "original" triplicate job ticket. He posts these costs onto the original order which he takes from his file, and sends the original to the originator. This copy tells the foreman how much his department will be charged. The job ticket is filed for future reference.

I don't care how small your maintenance force is, these are the minimum records for good maintenance control. Try to short-cut any of them and you'll find you can't give top management the complete picture of maintenance operations. Which means, when you go to claim what's due you, management puts on its Chinese laundryman act and says "No tickee, no shirtee!"

For advice on how to keep the boss sold, turn the page.

My Weekly Report That Keeps the Boss Sold on the Maintenance Job

Best way to sell top management any idea is to prove it pays. How can you do that with a maintenance plan that calls for more clerical effort? You have to go in the back door. You show management that the paperwork improves over-all

STATUS OF MAINTENANCE ORDERS

You can easily calculate the orders uncompleted each week by adding orders issued that week to the previous week's uncompleted orders, and subtracting the completed orders. And you can easily break the orders down by crafts. In multi-craft jobs you count the order for each craft.

The "month-old uncompleted orders" is a direct index of whether a craft is falling behind or catching up. Each week I sent a separate report to the general superintendent and the master mechanic, listing all month-old orders by crafts, showing date of issue. Reason? A hard-hitting production supervisor doesn't wait too long for anything. Often I found he got the job done without benefit of maintenance, or as a by-product of some other order. So this "uncompleted" order had to be wiped off the books. Also, the check-up spurred the master mechanic to complete old orders.

WEEK ENDING	TOTAL ORDERS			MACHINISTS				BLACKSMITHS				
	ISSUED	COMPLETED	NOT COMPLETED	ISSUED	COMPLETED	NOT COMPLETED	MONTH OLD UNCOMPLETED	ISSUED	COMPLETED	NOT COMPLETED	MONTH OLD UNCOMPLETED	ISSUED
10-8	54	41	231	35	21	54	20	4	1	21	15	9
10-15	62	59	234	26	25	55	22	5	2	24	17	9
10-22	78	70	242	34	33	56	19	5	3	26	18	15
10-29	58	68	232	28	33	51	17	5	9	22	17	7
11-5	69	66	235	31	36	46	18	6	6	22	17	11
11-12	77	72	240	34	32	48	17	4	5	21	17	18
11-19	67	73	234	36	36	48	19	4	4	21	20	10
11-26	37	40	231	12	13	47	21	4	5	20	18	10
12-3	59	56	234	32	29	50	22	4	2	22	18	7
12-10	60	64	230	25	24	51	22	5	7	20	16	6
12-17	69	39	260	29	14	66	26	8	4	24	17	7
12-24	65	54	271	26	20	72	30	3	1	26	18	11
12-31	36	48	259	15	21	66	29	3	3	26	18	1
QUARTER TOTALS	791			363				60				121

TOTAL MTCE. $	TOTAL PLANT PRODUC-TIVE-$	% OF PLANT PAYROLL	MACHINISTS		BLACKSMITHS		CARPENTERS		FOUNDRY EQUIPMENT		FACTORY ORIGINATING MACHINERY		MATERIALS HANDLING EQUIPMENT		PLATING EQUIPMENT		MAINTENANCE EQUIPMENT		OTHER FACTORY MACHINERY	
			$	%	$	%	$	%	$	%	$	%	$	%	$	%	$	%	$	%
625	7727	8.1	394	63	33	5	53	8	18	2.9	122	20.0	27	4.3	93	14.4	3	0.5	23	3.7
651	7828	8.3	407	62	52	8	53	8	52	8.1	108	16.3	39	6.0	63	9.7	3	0.5	70	10.8
716	7995	9.0	416	58	45	6	53	7	24	3.4	127	17.8	40	5.6	63	8.8	2	0.3	54	7.5
523	4904	10.6	333	64	36	7	43	8	48	9.2	126	24.1	36	6.9	65	12.2	3	0.5	45	8.7
8033	96,638	8.3	4944	62	568	7	700	9	582	7.1	1670	20.6	425	5.2	910	11.1	31	0.4	540	6.1

MAINTENANCE PAYROLL

Here is a maintenance yardstick. In my case it was the ratio of maintenance to productive payroll. These are figures anybody can understand, from the president down.

LABOR COST OF REPAIR AND REPLACEMENTS BY TYPE OF EQUIPMENT

This final analysis gets down to cases. Any clerk can tabulate this breakdown from the data on the maintenance order. My exhibit covers the last quarter of the year. Let's see some of the values of this breakdown. Look at the quarterly total of

maintenance efficiency, pinpoints trouble spots, weeds out extravagances. In short, it gives the most maintenance for the money. And don't forget, good maintenance means lower production costs.

Management wants — and is entitled to — facts. That's the purpose of my weekly report. I'm giving it to you in separate, progressive parts. Actually I combined all these parts in a double-page bulletin, which I call the "Weekly Distribution of Maintenance Labor."

Each bulletin provides the data for 13 weeks, or one quarter of the year. Inside it has seven parts, and a condensed summary on the cover. All the facts it contains are derived from the paperwork just described or from associated payroll figures. Here is how. And here also are some of the benefits.

AVERAGE HOURS PER REPAIR ORDER

This covers repairs only, for each craft. Total hours divided by the orders gives the average hours. These averages show trends. For example, compare the cumulative totals for the current quarter with the same quarter in previous years (to eliminate seasonal effects). If the average order took more time, was the equipment in worse shape? Were your craftsmen doing as good a job? The comparative averages for each craft are informative, too, in sizing up jobs and crews.

MAINTENANCE HOURS PER CRAFTSMAN

This analysis is best derived from payroll totals. You can trace inequities in craft work loads here, also where overtime is going craftwise.

MACHINISTS			BLACKSMITHS			CARPENTERS		
HOURS	ORDERS	HRS. PER ORDER	HOURS	ORDERS	HRS. PER ORDER	HOURS	ORDERS	HRS. PER ORDER
193	21	9.2				18	1	18.0
859	41	21.0	13	2	6.5	49	7	7.0
1095	62	17.7	49	5	9.8	63	13	4.8
1818	87	20.9	54	7	7.7	91	15	6.1
2159	120	18.0	78	10	7.8	134	20	6.7
2442	147	16.6	97	13	7.5	222	28	7.9
2700	183	14.7	115	16	7.2	301	43	7.0
2993	195	15.3	169	19	8.9	323	49	6.6
3230	220	14.7	227	20	11.4	398	52	7.6
3576	240	14.9	260	25	10.4	418	55	7.6
3667	253	14.5	303	26	11.7	435	56	7.8
3784	271	14.0	306	27	11.3	466	61	7.6
3959	291	13.6	308	28	11.0	495	67	7.4
3959	291	13.6	308	28	11.0	495	67	7.4

TOTAL HOURS	TOTAL CRAFTSMEN	HOURS PER CRAFTSMAN	MACHINISTS		BLACKSI
			HOURS	MEN	HOURS
893	22	41	556	14	50
957	24	40	586	15	89
1020	24	43	599	15	80
904	23	39	560	14	72
929	24	39	560	14	72
963	24	40	560	14	72
958	24	40	564	14	72
781	25	31	440	15	64
955	24	40	565	14	102
939	24	39	576	14	93
867	24	36	541	15	88
862	24	36	526	15	80
767	24	32	478	15	64
11795 907 Avg.			7111		998

OTHER FACTORY EQUIPMENT		HEAT-LIGHT POWER GENERATION		HEAT DISTRIBUTION		LIGHT DISTRIBUTION		MECHANICAL POWER DISTRIBUTION		ELECTRICAL POWER DISTRIBUTION		ALL OTHER SERVICES DISTRIBUTION		BUILDINGS		BUILDING EQUIPMENT		OFFICE EQUIPMENT		WORK DONE BY CONTRACTORS	
$	%	$	%	$	%	$	%	$	%	$	%	$	%	$	%	$	%	$	%	COST OF LABOR AND MATERIALS	CLASS OF EQUIPMENT
22	3.5	3	0.5			1	0.2	14	2.2	24	3.8	5	0.8	12	1.9	5	0.8	2	0.3	NONE	
59	9.0	4	0.6	24	3.7	11	1.7	11	1.7	5	0.7	27	4.1	5	0.7	5	0.7	1	0.2	"	
95	13.1			6	0.8	4	0.5	9	1.2	80	11.1	45	6.3	25	3.5	5	0.7	1	0.1	"	
13	2.5	1	0.2	15	2.9			10	1.9	9	1.7	34	6.5	5	1.0	2	0.4				
649	8.1	12	0.2	229	2.9	52	0.6	224	2.8	252	3.1	289	3.6	132	1.7	52	0.6	27	0.3		

$229 under "heat distribution." Is this enough to make sure a group of multi-story buildings covering two city blocks is ready for a New England winter? It certainly has a direct bearing when a department is sent home for lack of heat.

Is $12 under "heat-light-power generation" in a 750-kw. powerhouse reasonable insurance against a crippling shutdown? Is $132 under "buildings" sufficient upkeep for two city block of buildings and yards? Is $52 enough for "building equipment"? These are questions any top manager can understand. And these are data any production manager or maintenance executive can marshal to support maintenance recommendations.

More on next page

HOURS WORKED ON BLANKET ORDERS

Any maintenance control system must have a depository for the small, continually occurring repair jobs. The blanket or standing order is a reasonable answer to the busy foreman's plea, "I haven't time to write an order for every bolt I want tightened." However, management should know the extent of this type of work, or else real control of maintenance labor is voided. You do well to keep blanket orders to a minimum, lest they become a catch-all for bona-fide repair jobs. And you need to police them to keep them within bounds. This analysis does that for you. ↓

	WEEK ENDING	ORDERS			PAYROLL				PAYROLL DISTRIBUTION % OF TOTAL SPENT TO			
		ISSUED	COMPLETED	NOT COMPLETED	TOTAL	% OF PLANT PROD.	% ON BLANKET ORDERS	% ON ESTIMATES	INSPECT	REPAIR	REPLACE	NEW WORK
1	10-8	54	41	231	625	8.1	18		2	55	4	38
2	10-15	62	59	234	651	8.3	25		5	60	9	20
3	10-22	78	70	242	716	9.0	21		4	74	7	15
4	10-29	58	68	232	616	7.6	20		7	65	2	26
5	11-5	69	66	235	626	8.3	19		4	74	2	20
6	11-12	77	72	240	650	8.5	19		5	75	10	10
7	11-19	67	73	234	644	8.3	24		5	77	7	11
8	11-26	37	40	231	525	8.1	21		5	69	4	22
9	12-3	59	56	234	644	8.2	13		4	60	10	26
10	12-10	60	64	230	634	8.2	17		5	79	8	9
11	12-17	69	39	260	592	7.6	17		4	57	5	34
12	12-24	65	54	271	587	7.7	25		5	76	8	10
13	12-31	36	48	259	523	10.6	18		5	73	6	16

TOTAL	% OF MAINT. HOURS	MACHINISTS		BLACKSMITHS		CARPENT
		HOURS	%	HOURS	%	HOURS
69	19	93	17	22	44	24
47	26	165	26	24	27	39
28	22	122	20	38	47	24
94	21	143	25	18	25	12
92	21	113	20	31	43	25
01	21	127	23	20	28	34
39	25	157	28	41	57	18
75	22	79	18	30	47	30
32	14	104	18	12	12	4
64	17	100	17	20	21	9
70	20	135	25	7	8	18
29	27	186	35	12	15	17
52	20	111	23	6	9	23
492	21	1624	23	281	28	277

CONDENSED ANALYSIS ↑

Your management executive won't want to wade through the preceding seven breakdowns every week unless he thinks something is wrong. So you capsule the trend indicators in the condensed analysis for quick digestion. I think you'd be wise to separate this analysis from the others. That's why I put mine alone on the front cover. You don't scare the boss by a maze of figures. Yet a flip of the page will tell him more if he wants it.

This condensed analysis is your come-on. Put it on top management's desk regularly to make him maintenance-conscious. Once he sees where the money goes, and how thin you sometimes have to spread it, you stand a far better chance of justifying more funds for a good maintenance program.

INSPECTION		REPAIRS		REPLACEMENTS		NEW WORK		WORK DONE ON BLANKET ORDERS		WORK DONE ON ESTIMATES	
$	%	$	%	$	%	$	%	$	%	$	%
14	2	346	55	28	4	237	38	115	18	NONE	
33	5	426	66	61	9	131	20	163	25		
29	4	532	74	48	7	107	15	148	21		
25	5	383	73	29	6	86	16	96	18		
381	5	5562	69	514	6	1576	20	1588	20		

DISTRIBUTION OF PAYROLL BY TYPE OF WORK ↑

Now we give some more fundamental management data. You get this breakdown from the "type of work" on the maintenance order. For instance, in the second week here (second line) we had learned from another report on the group that 24 maintenance craftsmen were working. But now we see that 20% of their time was spent on new work. Now look at the 5% for inspection. Is it enough? This figure is of vital interest to the general superintendent (faced with downtime delays), to the maintenance executive (loaded with rush orders), and to top management (worried about overall costs and depreciation). It is the key figure in any remedy for complaints about maintenance.

ILLUSTRATED BY
HOWARD WILLIAMSON

"Supposing," said Quint, "you'd asked him. Not told him! Asked him!"

"You Can't Put a Mind on a Conveyor"

By RAY W. SHERMAN

WHEN TOBIAS QUINT was made Plant Manager of Central Manufacturing he resolved he would smile at every person who entered his office.

But he was having trouble now working his leathery wrinkles into a smile, for the visitor was Chuck Farr, Industrial Engineer, and Toby was sure Chuck was going to be unhappy over the new conveyor in M-T.

However, he smiled, and waved toward a vase of flowers from the factory lawn. "Happy birthday," he said, "from the Plant Engineer."

"They're pretty." Chuck didn't smile as he settled in a chair. "You don't look it, Toby, but you must be all of four hundred years old. It would take at least that long to assemble as many dumb foremen as you've got."

Toby laid his glasses down and rocked back in resignation.

"What now, Chuck?"

"That conveyor in M-T. Swell idea, what?"

"I thought it was."

"It ain't!" Chuck snapped. "The men are taking the stuff off, doing the work on the bench, and putting it back on the conveyor again. And—"Chuck slowly baritoned the foreman's voice —"Old Tom Callahan won't do a thing about it. Says the men always did it on the bench. Next thing he'll want to tear out the water piping, dig a well in the yard, and hire a water boy. Unless—"

"Unless what?"

"Unless you make him do it right."

Toby's jaw set. "I won't!"

"OK." Chuck upped a shoulder.

Toby fished up a cigarette. "Conveyors are conveyors." He blew a cloud. "Minds are minds. And you can't put a mind on a conveyor."

Chuck looked puzzled.

"I could order Old Tom to do it your way—and he would." Toby was looking at a corner of the ceiling. "So would his men. But—their cooperation would be nil. *You've* got to see 'em. Maybe even make 'em think they thought of it themselves."

Chuck said "Huh?" but Toby didn't hear it.

"Supposing —" Toby put on his glasses, took them off, and laid them on the desk again. "Supposing you had gone to Tom—at the start—told him if you could cut handling you could cut costs. Asked him if he had any ideas. Not told him! Asked him! Maybe, before you got through, he'd have thought it was his own idea—and sold it to his crew. Old Tom could do that—if he was on your side."

Chuck shook his head. "Old Tom wouldn't do it."

"Takes me back," Toby grinned, "about three hundred and fifty years. The plant was small then. One Thursday the Old Man called his three foremen in and said he couldn't meet all of Saturday's payroll till the middle of next week."

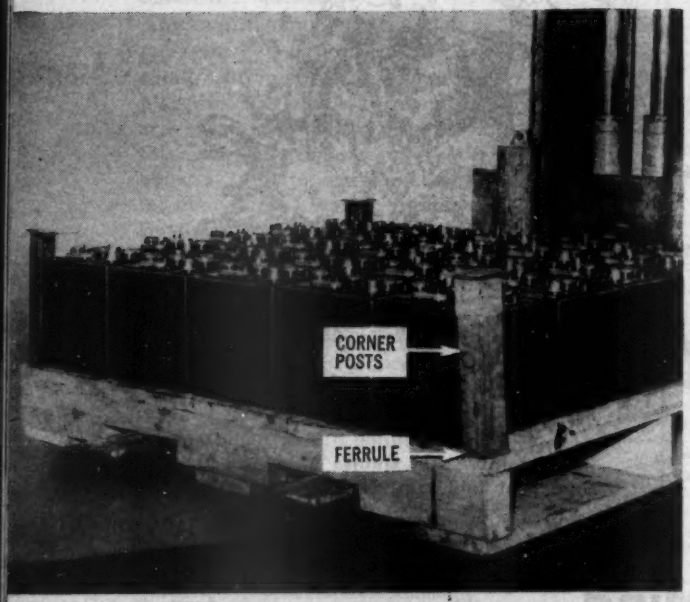
"What's that got to do with getting Old Tom Callahan to like my conveyor?"

"Wait!" Toby held up his hand. "We three suckers drew money next day and loaned it to him. Me—fellow named Timmons—ahd—" his eyes turned toward Chuck "—the guy who thought of it—Old Tom."

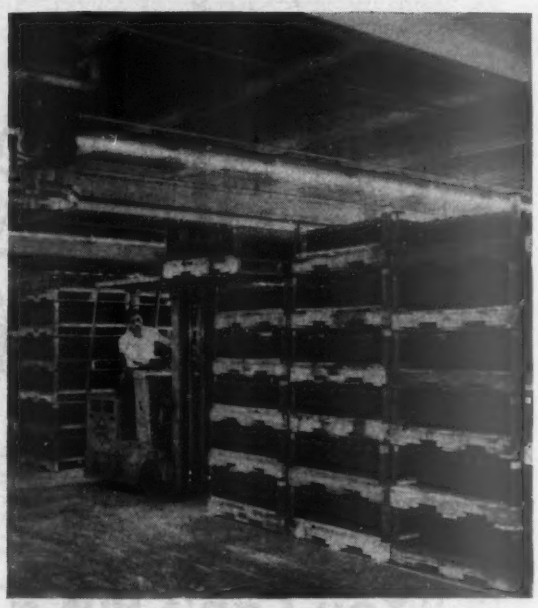
"Toby!" Chuck pulled at the point of his chin. "Could you be hinting—that the Industrial Engineer—should go down and ask the foreman in M-T—how to run a conveyor?"

"Why, Chuck!" Toby tried to look surprised. "Maybe that's a good idea!"

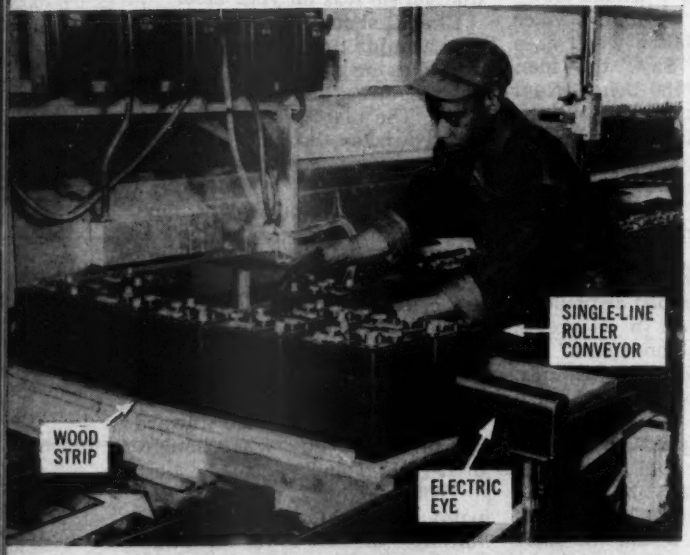
THIS NEW METHOD OF USING PALLETS FOR



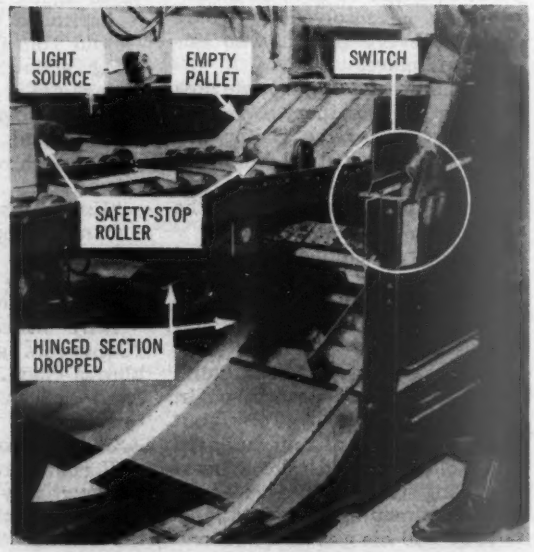
1 **BATTERIES ARE PALLETIZED, 25 to a pallet, just as soon as they're built by Willard Storage Battery, but before painting and charge testing. Pallets were designed by Willard. The angle-iron corner posts support the load when pallets are tiered. Posts are hand-inserted in metal ferrules at each corner.**



2 **PALLETS ARE TIERED six- or seven-high in the warehouse. Before, they were stored in the production area. Willard makes batteries in several sizes, but all are handled the same way, between 20 and 25 on a pallet. They stay in storage until an order arrives, then they are painted and recharged.**



4 **WORKER SLIDES BATTERIES off the pallet onto a single-file roller conveyor. There's no lifting. Batteries will ride the conveyor through cleaning and painting operations. Wooden strip, nailed to the rear of the pallet, helps hold the load. Almost all muscle-work has been eliminated.**



5 **EMPTY PALLETS ARE RETURNED on a two-level conveyor. Worker pushes button to drop hinged section of conveyor, sliding empty pallet onto lower level. Safety-stop rollers rise when section drops. Electric eye prevents section dropping when batteries are still on pallet.**

MOVING BATTERIES SHOWS HOW TO . . .

. . . Palletize Hard-to-Handle Products

That's what Willard Storage Battery of Cleveland has done—and profitably. Manual handling is almost eliminated. Handling time is cut 30%. Fewer batteries are rejected. Storage space is increased.

By R. E. GILKS • Assistant Works Manager
Willard Storage Battery Company
Cleveland

3 BATTERIES ARE INSPECTED right after they are recharged. A pallet-load can be recharged at a time—right on the pallet. Pallet-loads are inspected on a roller conveyor. Just a shove rolls the pallet to the next operation. The corner posts have been removed because there'll be no more tiering.

6 BATTERIES ARE STACKED ON PALLETS for shipping. Bottomless cartons, higher than the batteries, are slipped over batteries. They protect the tops; permit stacking five-high on pallet. Hydraulic positioner keeps stack level with conveyor and eliminates most of the heavy lifting.

PROBLEM • Handling storage batteries is tough. Batteries probably weigh more per cubic foot than any other consumer product. Men can't lift them all day without tiring. There's nothing to grab on to easily. Filler caps and terminals prevent stacking. If they're tipped, acid spills out. Paint chips during handling. They lose their pep in storage.

But at Willard we think we have licked the problem.

SOLUTION • Palletization. It starts right after manufacture, but before the batteries are recharged and painted. They stay right on the pallets until they're recharged, ready for painting and shipping.

The picture sequence at the left tells you how Willard has taken the work out of handling. Where there is manual handling, it's only an easy slide. The heavy work's done with power.

BENEFITS • Both Willard and Willard's customers have benefited from the new system because:

1. Batteries are no longer stored in the production area. The space is used for manufacture.
2. More batteries can be stored per square foot, because the new pallets permit higher tiering.
3. Workers have been relieved of most of the heavy work.
4. Rejections of damaged batteries have been reduced. Palletized handling doesn't damage them.
5. Shipments leave the plant 30% faster.
6. Customer gets a freshly painted, fully charged battery.

50 COMPANIES TELL YOU . . .

. . . How to Solve Your Parking Problems

Here are the results of an informal survey made by FACTORY's editors. They give you a picture of the kinds of parking problems other plants face—and how they've been solved.

There are lots of ideas here. Look 'em over. Some may be just what the doctor ordered for *your* parking problems.

"PARKING ISN'T A BIG PROBLEM to me personally. But it's constantly annoying. If people aren't alibi-ing lateness with 'couldn't find a parking space' stories, they're claiming we ought to pay for bumped fenders—or that they ought to have gold-plated private parking places. Nothing big, but it's never-ending. I don't know what to do about it, but I know *something* ought to be done!"

This man is a production superintendent—a busy man. His comment is pretty typical—a sort of composite of the reactions of men who have to get production out.

Now here's what a personnel man has to say:

"The parking problem may be likened to sinus trouble. Many people suffer from it, but little attention is paid to it because few people die from it."

That about sums up the parking problem. It's annoying, irritating, but rarely blocks production in a big way. So it generates a lot of gripes but not so many real solutions. That's the reason for this article. It's sort of a "buffet supper" of ideas culled from 50 plants. Out of these ideas, FACTORY hopes more plants will be able to make up the "full meal" they need—a practical solution to parking problems.

A word about how this survey was conducted. FACTORY sent a letter of inquiry to some 200 companies, simply asking them for "tips" that might help others. Replies came from 85 companies of all sizes, from 43 different localities in 12 states.

The 50 companies that had specific ideas to offer, based on their own experience, did yeoman work, for which FACTORY is grateful. Here are their suggestions.

CAMOUFLAGE will cut complaints about parking lots in residential areas, says Samsonite Luggage

PROBLEM 1: How to get more space

Getting more room to expand parking lots is tough. Even where property is available, zoning rules and high land costs are big obstacles.

What to do about these problems? These are suggestions from FACTORY's respondents:

• **Use railroad rights of way.** Many plants have railroad sidings coming in, and are near railroad rights of way. Three companies report they have been able to take advantage of this favorable situation to get more parking space. They rented right-of-way space from the railroads.

• **Use slum-clearance areas.** City slum areas are under constant attack by public-spirited groups. As slum clearance programs are pushed, you may be able to take advantage of favorable public reaction by buying up dilapidated buildings. One company reports it has just bought an entire block of such property right across the street from its plant.

You may be able to get help from traffic authorities, too. They may be willing (if you can prove the need) to certify the importance of providing more parking space to relieve traffic congestion. Such support can greatly help in getting necessary condemnation authority for clearing out slums for parking—or for securing waivers on certain zoning rules.

• **Beautify lots to please zoning authority.** To get around zoning rules, here's an idea that has worked well. It has worked so well, in fact, that the company has been used as a case example for other plants by the city administration (Denver)

Division of Shywayder Bros., Inc., Denver. Brick walls and shrubbery make this lot a real asset.

and the zoning boards. The company got what it wanted by proving parking lots could actually *improve* the area, and increase surrounding property values.

The company did three things: surfaced the lots; built an attractive, low brick wall around each; and planted dense shrubbery in front to obscure the view from the street (see photograph). This company, by the way, has been buying or leasing property around its plant for 10 years, as a parking problem antidote. It's now reaping the benefit of its foresight.

PROBLEM 2: How to discourage driving

• **Use car pools again.** Car pools, or ride-sharing, started in a big way in World War II, seems to have persisted to a surprising degree. As a result, this is the most popular method reported for relief of congestion on lots. Some companies have had it easy. A typical comment:

"Without any effort on our part, individuals throughout the plant are making up car pools."

But most plants aren't so lucky. They have to make ride-sharing work. Biggest problem is getting information from drivers to riders, and vice versa. Common methods are: special section of plant paper or magazine advertising rides wanted and rides available; special articles talking up the importance of ride-sharing; special bulletin board in plant on which ride notices can be posted without red tape; designated person in some office (usually personnel or plant protection) who serves as a clearing house for ride-sharing information.

One company goes further, with a plan that's simple and uncommonly effective. It works like this: Because of shortage of space, parking is solely by assignment to specific, reserved spaces. To keep spaces full, the company maintains a waiting list of employees desiring parking privileges. When a vacancy occurs, a ride-sharing car gets the nod over a single-passenger car. As a result, the company reports, its parking lot space is currently occupied by close to 90% ride-sharing cars.

• **Try for better bus service.** Encouraging bus transportation is much talked of as a way to get employees to work without driving. But only a handful of companies (five) report significant help from this source. Three of the companies say they have succeeded in getting bus companies to change their routes, thus making it more attractive for employees to come to work by bus. And one plant has persuaded the operator to run his buses right up to the plant entrance. A number of plants say they *wish* they could do something about making bus service more attractive, but can't.

An old stand-by was suggested two or three times. It's worth a reminder. Protection of employees waiting for buses or other types of public transportation is important. If you can't do anything else, at least make sure there are proper shelters at waiting points.

• **Charge employees to park.** It will cut down the number who drive. Four companies report they're doing this. You may not think it's good employee relations to handle the problem this way. But it's one method now in active use.

One company owns and leases several parking lots to operators, who charge the employees $1.50 a month per car or car pool. Usually the operators are former company employees who have retired.

Here's another:

"We own and lease out five parking areas adjacent to the plant to private operators who charge a fee of $2.50 monthly for parking. At two of our locations we have inside parking, for which a slightly higher rate is charged."

PROBLEM 3: How to control traffic

• **Keep gate areas clear.** "Don't let employees pick up or discharge riders at or near gates or in aisles." That's the most common suggestion.

• **Have more gates.** This is a close runner-up in popularity. There are many variations:

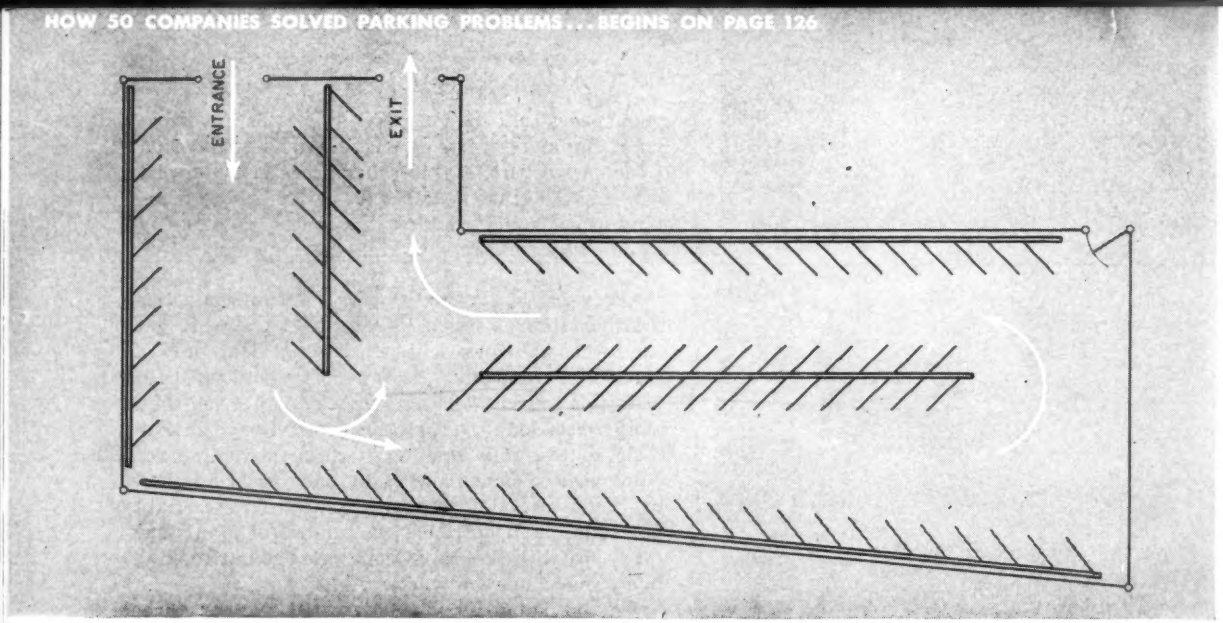
"Approximately a year ago, there was a serious problem due to auto and pedestrian congestion, which has been solved by opening gates on two sides of the parking lot . . ."

"We provided another entrance, so the lot can be entered from more than one direction."

"We have three exits from the parking lot, which permits rapid exit as well as entrance."

"We have a special pedestrian entrance, which greatly simplifies traffic control."

More on next page



THE ADVANTAGES of one-way traffic in lots are described by several companies. The illustration above shows how Kendall Refining Company, Bradford, Pa., has arranged a small lot one-way throughout.

• **Traffic lights also help.** No company reported use of lights within the lots themselves. Their main value, apparently, is where traffic is moving out onto public highways. One plant warns that getting lights put in isn't easy. You need cooperation of police and highway department officials, usually have to have plenty of facts about volume of traffic and the need before you'll get very far.

• **Use left- and right-turn lanes for exit traffic.** They eliminate jockeying back and forth. One company uses solid yellow lines down the middle of the exit route, has big "east," and "west" directional signs painted on black-top surface of road to warn cars to get in proper lanes.

• **And don't forget snow removal.** "We don't make a lot of fuss over snow removal," one plant reports. "But we have little trouble and expense, because we have set up two of our plant trucks with snow plow hitches. Comes winter, all we do is hang the plows on when we need them, and clean out the area before the lot gets jammed. If it snows during the day, we run the trucks through once or twice, and do the real clean-up later."

PROBLEM 4: How to get the best layout

• **Separate parking spaces by physical barriers.** Many plants think marking spaces with lines isn't enough. The common solution is wooden bumpers between lines, with cars parked at right angles. Railroad ties, used construction timbers, old telephone poles, and (rarely) concrete dividers or metal posts with chains are also used.

And, to keep bumpers and fenders from clashing, one plant puts in vertical posts, against which bumpers hit. (See story on page 131.)

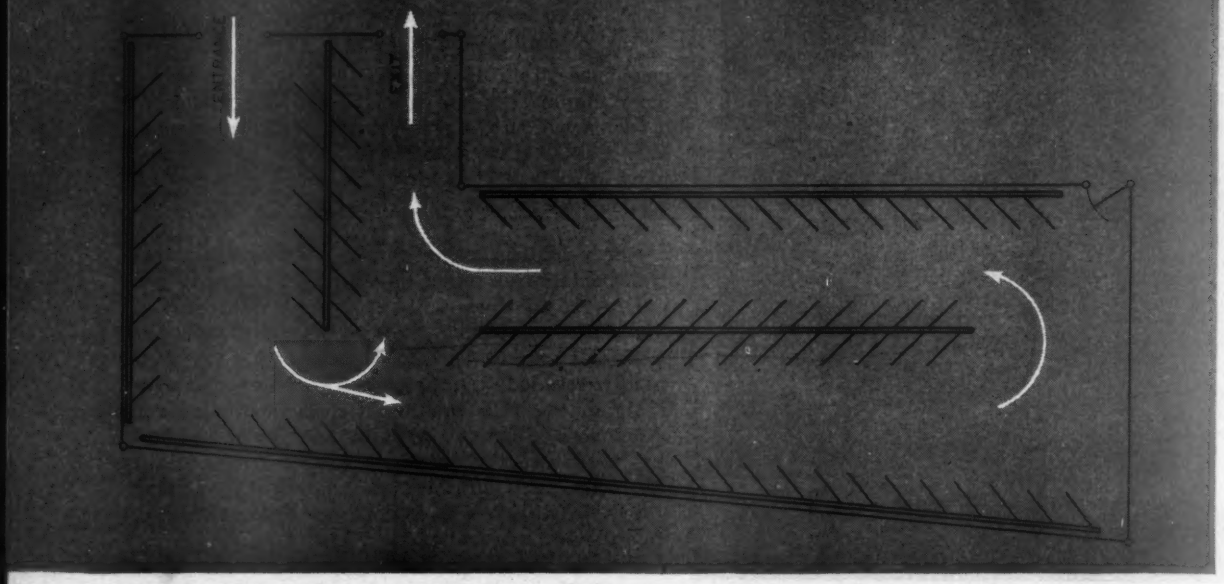
• **Don't let employees park cars at right angles.** This is one of the most common "tips." Here's a typical comment, based on experience with right-angle and "other-angle" parking:

"Our parking lots used to be at right angles to the dividing pipes. Our experience with this parking was that it caused considerable confusion and wasted time because employees had to 'jockey' their cars to park at right angles."

What's the best angle? It's hard to answer; seems a tie between 30 and 60 degrees.

What's the best *pattern* for angle parking? This is a question that most companies apparently haven't even thought of. But it has some interesting implications. For example, if cars are parked at an angle in "V" design, there's a danger, even with dividing bumpers and upright posts, that the right fender of one car will hit the left fender of the car opposite. One way to get around this is to park cars at 60 degree angles on one side of a dividing line, and park the facing cars on the other side at 120 degree angles. That way, the only possible contact points are the bumpers of the facing cars. Fenders are safe. (For an example, see spaces in one-way layout, above.) And here's another solution, a "herringbone" pattern worked out by an ingenious plant management:

"Previous to this layout (see photograph), we had tried numerous other methods, all of which proved less satisfactory. Complaints from employees about damaged fenders, etc., were quite frequent under other layouts. The present design has been in use since May of this year without one single report of damage to employees' cars."



THE ADVANTAGES of one-way traffic in lots are described by several companies. The illustration above shows how Kendall Refining Company, Bradford, Pa., has arranged a small lot one-way throughout.

• **Traffic lights also help.** No company reported use of lights within the lots themselves. Their main value, apparently, is where traffic is moving out onto public highways. One plant warns that getting lights put in isn't easy. You need cooperation of police and highway department officials, usually have to have plenty of facts about volume of traffic and the need before you'll get very far.

• **Use left- and right-turn lanes for exit traffic.** They eliminate jockeying back and forth. One company uses solid yellow lines down the middle of the exit route, has big "east," and "west" directional signs painted on black-top surface of road to warn cars to get in proper lanes.

• **And don't forget snow removal.** "We don't make a lot of fuss over snow removal," one plant reports. "But we have little trouble and expense, because we have set up two of our plant trucks with snow plow hitches. Comes winter, all we do is hang the plows on when we need them, and clean out the area before the lot gets jammed. If it snows during the day, we run the trucks through once or twice, and do the real clean-up later."

PROBLEM 4: How to get the best layout

• **Separate parking spaces by physical barriers.** Many plants think marking spaces with lines isn't enough. The common solution is wooden bumpers between lines, with cars parked at right angles. Railroad ties, used construction timbers, old telephone poles, and (rarely) concrete dividers or metal posts with chains are also used.

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HERRINGBONE parking pattern works well, says Kroehler Manufacturing Company, Binghamton, N. Y.

• **Narrow the space between cars.** You can do it if you go to angle parking, say some companies. But just what's the "right" amount of space is unclear. Here's the trouble several plants mention:

"... In order to utilize all possible space, we have made our lines 7 to 7½ feet apart, which does present a bit of crowding, especially with the newer and wider cars."

The most lavish use of space was the plant that was assigning 10 feet per car. To economize, they cut back to 9 feet, 3 inches.

What's clearly happening is that plants that tried to keep spaces wide enough so car doors wouldn't hit their neighbors are now giving up on this aim. The doors are being allowed to hit.

PROBLEM 5: How to police parking space

Most respondents depend on guards or parking attendants to police parking lots. Smaller plants don't bother with full-time attendants generally. Typical comment:

"We put one of the workmen in the lot as a parking attendant during the 45 minutes that cars are arriving to go to work on each shift."

One company doesn't think this is the best solution. It makes no effort to police incoming traffic, but checks after cars are all in place, and calls on violators to come out and correct their errors.

The most common practice, however, is to have at least one full-time guard on duty to direct parking and prevent violations of rules. Also to help visitors park. Much emphasis is put on the educational job of those who police parking. But there's also evidence in company replies of a general conviction that parking would be a mess indeed if not carefully supervised.

Here are the three main aids to policing:

• **Use some form of identification for cars.** One plant uses a brass tag attached to the car's license plate. Another hands out a license-attached replica of the company's trade mark. But the more common practice is to issue a sticker or decal for the windshield. (Be sure they don't violate laws against blocking windshields, one plant warns.) The general practice with stickers and decals is to change them every once in awhile. Where there is more than one parking lot, different colors are often used for identifying symbols.

But identification symbols don't solve all the problems. One company puts it this way:

"We have some difficulty, in spite of decal stickers, in keeping 'foreigners' out. We periodically 'clean up the joint' by sending a man over to check up. We also write the people from the community who use the lot a polite letter suggesting that they use public conveyances so that we will have room enough. It has helped some."

Another approach:

"Visitors' lot is supervised by a member of the guard force. He issues a card to visitor, which must be stamped by receptionist. When visitor returns for car, he must show stamped card to guard, or pay nominal parking fee."

One company also reports a system of fines for its own employees who park without proper identifying sticker. After two warnings, employees are fined 50 cents for each violation.

• **Use parking tickets for rule violators.** The main violations are parking in wrong place (driveways and reserved areas), and "straddle" parking that uses two spaces. Example:

"To keep down violations, we have a warning ticket which the attendant uses and issues by giving it to the employee or putting it on the car. A copy is put in the employee's personnel folder, and if more than one is issued for the same violation, his supervisor is asked to speak to him about possible loss of parking privileges."

• **Use auto registration to help policing.** This is usually the personnel department's job.

Keeping records up to date is tough, since licenses change yearly in most states. One company uses its up-dating questionnaire to get additional information about driving habits and needs. Then it tries to talk those who apparently don't need to drive into coming to work some other way.

Another company issues a sticker to very car it registers. The sticker admits the car to the parking lot, and also permits the car owner to buy gasoline at cost at a special filling station the company maintains. Chronic rule violators are punished by loss of their stickers. This, says the company, "requires them to park in a more distant lot, and deprives them of the low-priced gasoline privilege." (This company is *not* in the oil business.)

More on next page

PROBLEM 6: How to assign parking space

Making parking lot assignments is a common headache. Here are some of the answers that plants have come up with:

• **Assign on basis of seniority.** This isn't common, but has strong supporters. One company puts it this way:

"Recently we enlarged the parking area within the grounds and assigned the new space to the female employees on the basis of seniority. We found this method of assignment worked very well. I think if we had it to do all over again, we would assign all inside space on the basis of seniority."

Another plant describes its plan like this:

"We have adopted the principle of assigning parking spaces on the basis of seniority. On all areas we have over-assigned by approximately 10% to allow for absenteeism, auto repairs, or other causes that prevent a driver from bringing his car on a particular day."

• **Assign reserved spaces on basis of job status.** This is probably the most common method of assignment. Executives, department heads, supervisors, or just "salaried personnel" are the groups commonly given special parking place treatment. In most cases, these are simply first-come-first-served reserved areas. Some companies go further, mark each space with a number or name.

• **Charge a fee for reserved spaces.** One company has a limited number of garages that it rents to employees. Two others rent out choice locations, the reasoning apparently being that this is one way to get around a lot of argument over who gets assigned to where. Here's how one of these plans works:

"Two large areas are designated as first-come-first-served, so that everybody will have at least an opportunity to park. The balance of the lots are reserved areas for which employees pay 50 cents a month. A designated space is not assigned to an individual, but those paying the above fee through payroll deductions are assured of a space in a lot they're assigned to."

• **Assign on basis of geographical location.** Nearness to assigned plant entrance is the usual standard. One company says:

"We have four parking lots, and have assigned each lot to a particular group of employees, namely those who use the time clock nearest that lot."

But watch out, another company warns. "We did make a mistake in one of our plants in trying to provide several different locations nearer entrances. Maintenance rises, and more supervision is required. We believe one lot is better."

• **Assign on basis of physical disability.** Special parking arrangements for the handicapped were mentioned by several respondents. For example:

"We do not have any special parking lots for executives. It is a first-come-first-served proposition. But we do have an area reserved nearest to the entrance gate for handicapped people."

• **Assign special space for "in and out" employees.** Special sections are often set aside for this type of problem. One company reports:

"One thing that has aggravated our situation is the need for in-and-out space. To further our production on defense items, we have sub-contracted a great many items that we ordinarily would make ourselves. The men in charge of that outside work necessarily have to come and go, and need parking space that will accommodate that requirement."

Another company thought it had solved the in-out problem when it assigned the first two rows of its regular parking lot to employees coming and going on company business. It didn't work, because late-coming employees promptly moved in on any empty spaces they saw in the special reserved lines. Now it has a fence around the area.

Another company has decentralized the job of assigning reserved in-and-out space:

"Each department head was then allotted a section in which cars of employees going in and out on company business were to park. He was to assign the spaces and completely administer the section."

• **Assign space on basis of shift schedules.** Here's a typical solution:

"We have set up a special lot for the supervisory and salaried employees who normally come to work later than the production employees. This set-up has taken all the cars off the surrounding streets, and we have not had any complaints regarding the private lot for salaried people."

One company advises: "One tip which we might offer is to open the lots on a staggered basis, filling those farthest away first, and working up toward the plant."

Companies that have several parking areas can perhaps follow the example of plants that set a lot aside for each shift. Or do this:

"We have two lots that are open 24 hours a day. When they are full, no one else is allowed to enter. We then have three other lots, one set aside for salaried employees who start later than factory people. There is also a separate lot for the second shift. The third shift is allowed in the salary lot, since that shift ends at 7 a. m., and the salary gate is closed until 7:45."

Want to build or enlarge your lot? See how one company did it — cheap. ——▶

WITH SALVAGED MATERIALS like the posts, timbers, and cinder fill shown here, Perfection Stove in Cleveland built its lot for 2½ cents a square foot—compared with the usual 20 cents. If you plan it right, you too can have a . . .

...GOOD LOW-COST PARKING LOT

THE 425-CAR PARKING LOT at the Ivanhoe Plant of Perfection Stove Company, Cleveland, is a tribute to the ingenuity of the Ivanhoe maintenance department.

The company estimates that the usual cost of building a good lot is 20 cents a square foot. Actually, part of the present lot (about 40%) was built at that cost when the plant was rebuilt in 1947. But the other 60%, added within the past two years, cost only 2½ cents a square foot.

The reason: Practically all the materials used were salvaged.

But the lot doesn't look "salvaged." It's well built, roomy. It allows an 8x20-ft. space for each car. Side aisles are all 23 feet wide. The two main roads through the lot are 30 feet wide. And the layout is planned so no car is ever more than 30 feet from one of these main roads.

Here's how the company did it:

• **Fill.** Two years in advance of construction of the lot, Perfection boiler plant employees began saving cinders from plant furnaces for the 8-in. fill. These were later spread and packed down by the company's bulldozer.

• **Bumper timbers.** When the Ivanhoe plant was remodeled and expanded three years ago, a supply of 10x10-in. timbers was left over from the job. These made up 75% of the materials needed for bumpers in the new lot. The rest of the timber came from old railroad ties and structural members salvaged from dismantled shipping docks.

Creosoted and held in place by scrap pipe driven down each side, these timbers are doing a good job of keeping cars in line.

• **Bumper stakes.** Each individual car stall is marked by a yellow stake, centered, to keep cars from hitting one another across bumper timbers. These yellow stakes were salvaged, too. They were originally 2x4-in. skids, received as dunnage with sheetmetal bundles.

• **Drainage.** Catch basins for drainage of the lot were put in when the ground was filled, as a preparation for bigger parking space. Grades were easily adjusted at time of topping, so the drainage was ready-made by the time the actual construction of the lot began.

But Perfection found it had one more job to do on drainage. Special drains had to be put in certain areas to keep water from washing under the timbers. Even here, salvage helped. Tile left over from the Ivanhoe rebuilding program was used.

• **Lighting.** In the lighting department, Perfection had to depart from its salvage policy. Here the equipment is new: street lights on the roadways, and flood lights in the parking area. Street lighting poles are of Union Metal tapered steel, with Westinghouse street lighting luminaires mounted at 25 feet, and Westinghouse floodlights mounted at 35 feet. Both kinds of lights can easily be lowered to the ground for servicing by means of Thompson disconnecting hangers.

The lighting at the plant ranks with that of Main Street in many towns. It has already received a lighting award for excellence.

• **Cost summary.** A run-down of the cost of expanding the Ivanhoe parking lot shows that approximately $151 was spent for miscellaneous materials such as cement, creosote, paint, bulldozer fuel, and nails. The cost of labor (and burden) was about $2182. Thus the total cost for 90,000 square feet of area ran around $2333, roughly 2½ cents per square foot. The first 60,000 square feet of lot, built with non-salvaged materials, cost $12,000. "Just like finding money," the company reports.

This industry-by-industry analysis of prospective growth was specially prepared to help you chart your own company's course through the rough and tough '50's.

It supplements the short- and long-term look at all industry you got from last month's "The Business Outlook—Now to 1960" (October, page 108).

FROM NOW TO 1960...

These Industries Are Due for Fastest Growth

By ROBERT P. ULIN
McGraw-Hill Department of Economics

CHEMICAL PROCESS INDUSTRIES promise to show spectacular growth in the next ten years. Their trend of production is still shooting upward, with no sign of leveling off, as new discoveries continue to broaden the range of chemical products.

In an economy with high labor costs, chemical plants will be called on for more and more of our national output. The magic of chemistry converts relatively cheap materials, such as brine or natural gas, into useful products, almost without the need for human hands. And they usually replace articles with a high labor content.

May double their markets

SYNTHETIC FIBERS · Rayon and nylon are growing at a rate that may double their markets by 1960. And new fibers, like Orlon or dynel, threaten to send wool the way of silk. At present the chemical plants are furnishing about 20% of our fiber requirements. By 1960 close to 40% of the fiber consumed by U.S. textile mills is likely to be synthetic. Even natural fibers are going to be drenched in chemicals to prevent shrinkage or wrinkling.

Up 50%

PLASTIC MATERIALS are finding new applications every day. Production should total 3-billion pounds per year by 1960, compared with 1.9-billion pounds in 1950. Not only molding materials to replace metal and wood, but plastic sheetings (in place of textiles), coatings, and adhesives will all come into greater use.

40% of synthetic organic chemicals will come from oil and natural gas.

PETROCHEMICALS are glamourizing the oil business. A swelling stream of finished chemicals will come from refinery by-products as the oil companies go deeper and deeper into this field. The industry is convinced that by 1960 about 40% of all synthetic organic chemicals will be made from oil and natural gas. Today the ratio is roughly 25% from oil and 75% from coal.

Gasoline production will rise sharply

Production of conventional refinery products will also rise sharply. The growing number of cars, trucks, planes, and buses making longer trips with bigger loads means more gasoline all the time. Much of it will be higher octane, for use in new high-compression engines. Diesel use is also on a sharp up-curve.

Need for drugs greatly multiplied

DRUGS · Doctors will prescribe for more people in the '50's than ever before. Both industry and government are increasing medical aid programs and multiplying the need for drugs. Antibiotics reap the biggest headlines. But all sorts of medicinals should gain.

Farm chemicals to offset higher labor costs

CHEMICALS FOR THE FARM must help offset labor costs and soil depletion. Fertilizer, insecticides, and weed killers will be needed to raise crop yields. There is a rising demand for new drugs to stimulate growth and reduce disease among livestock.

Big market for appliances

ELECTRICAL MANUFACTURING

ELECTRICAL MANUFACTURING • American homes still offer a great unsatisfied market for new kinds of electric appliances. Less than 10% of our households have electric dishwashers, food disposal units, clothes dryers, or bed coverings. Only about 25% have TV sets. Electric heating and air conditioning, still rare in home use, are pointing for big markets in the years ahead.

Must double 1950 capacity by 1960!

Electrical World estimates that the utilities must double 1950 capacity by 1960, triple it by 1965. This throws a huge and sustained demand on the electrical manufacturing industry—for generating and transmission apparatus, as well as for motors and other devices for industry and the home.

TRANSPORTATION

5½ million cars a year!

AUTOMOBILES • The auto market is broader than anyone imagined only a few years ago. Experts thought that those few years of filling the war gap would end in a "normal" market of 3.5-million cars a year. Now experts are talking of a normal market of 4.5- to 5.5-million cars a year. A family that used to drive a third-hand, 6-year-old car in pre-war days is now out for a second-hand 2- or 3-year-old car—and so on up the income line.

Post-war forecasters confounded

TRUCKS • The strength of the postwar truck market has confounded postwar forecasters. Trucks have taken an increasing amount of traffic away from railroads. With the present railway rate structure, they should continue to gain during the next decade. And many of the new transportation demands—like those arising from the growth of frozen foods and meats—call for the trucker's flexibility of service. So production of trucks should increase faster than industrial production in general.

RAILWAY EQUIPMENT • With planes, buses, trucks, and private cars all scheduled to grow at the expense of railroads, the manufacture of railway equipment would seem to be a declining industry. Paradoxically, it may grow at least as fast as industrial production generally. New equipment—diesel locomotives, new passenger and freight cars —provide one of the most promising routes to lower costs. So the railroads will go on buying all the new equipment they can afford.

MACHINERY

Sales tripled since 1939 — will double, maybe triple

OFFICE MACHINERY • Armies of pencil pushers are being rapidly replaced by office machines that do everything from solving simultaneous equations to registering banking transactions in half-a-dozen currencies. Machines do the job faster. They almost never make mistakes. Their introduction is being encouraged by the upward trend of clerical wages, and by steady expansion of statistical research in both business and government. Sales of tabulating and accounting machinery have tripled since 1939. New electronic models are opening up statistical fields that have hardly been tapped. In the next 10 or 15 years annual sales of office machinery may again double, even triple.

Farms will go on mechanizing

AGRICULTURAL MACHINERY • U.S. agriculture is undergoing a revolution in which machines are replacing hand labor. Despite record machinery purchases since the war, this revolution is far from completed. It will take more than a decade to bring all U.S. commercial farms up to present first-class standards of mechanization.

Up faster than industrial production as a whole

CONSTRUCTION MACHINERY • There are two reasons why the output of construction machinery should grow faster than industrial produc-

tion as a whole. One is the rising need for heavy construction—more and better roads, bigger housing developments, more schools, hospitals, reclamation projects. The second reason is, again, rising labor costs. Contractors will be under pressure to mechanize their operations to keep bids in line.

Sales sights raised

SPECIAL MACHINERY · Manufacturers of mining, textile, paper, printing, and food machinery find their sales sights raised by higher labor costs in customers' plants. In coal mining, continuous mining equipment promises large savings, should be adopted by half of the industry by 1960. In food the trend towards increased processing—as in frozen pre-cut meats or concentrated drinks—should boost equipment purchases. More materials handling equipment will be a necessity in warehouses and factories.

43% of our machine tools are at least 10 years old

OTHER CAPITAL GOODS · We entered the decade with high labor costs stimulating capital investment. Mobilization brought a new impetus. In the post-emergency years total expenditures for new plants and equipment will depend largely on the level of corporate profits and taxes. There may be less incentive to expand capacity. But sales prospects will be brighter than average for any machinery maker who promises large cost savings—because the emphasis will be on greater efficiency, lower costs.

Also, there are vast opportunities for replacing old machines with new, more efficient ones. Some 43% of our machine tools were at least 10 years old, according to *American Machinist's* 1950 inventory. One in five was at least 20 years old. McGraw-Hill surveys show that, over the long term, an increasing share of capital expenditures will go to replace such obsolete machinery.

1950 a sensational year - and markets will grow steadily

HOME FURNISHINGS will enjoy a much greater market in the '50's than in any past period. Sales may not immediately push through the sensational top made in 1950, a record year for forming new households. But the normal market will grow steadily. As the need to put up with "any place to live" becomes less urgent, people are quite likely to want homes that are bigger and better equipped. Larger families and more leisure should lead home-owners to spend more of their incomes on home improvements, furniture, and appliances.

The trend to more home convenience and comforts will benefit a variety of industries—*textiles* for drapes, upholstery, and bedding; *plastics* for kitchenware and playrooms; *floor coverings*, and *lighting fixtures*. If these lines are effectively merchandised, the refurnishing of homes may be as important in the '50's as the equipping of new homes in the immediate postwar years.

It's easy to pick the growth industry in transportation

NON-MANUFACTURING INDUSTRIES · There's lots of growth ahead for oil and gas producers. Natural gas is the fastest growing fuel. Also in the mining field—although there are chemical processes involved—are the light metals (aluminum, magnesium, and titanium), which have spectacular growth possibilities.

In transportation it's easy to pick the growth industry. It's the airlines. But don't overlook the pipeline companies.

Among the trade and service industries we're likely to have a continuing boom in new store construction. And, with shorter working hours and longer vacations, there'll be expansion in services connected with travel and recreation.

Growth in all these non-manufacturing lines is important to manufacturing industry, since it expands the markets for factory products bought by mining, transport, and other companies.

Need Help With Your Problems?

IMPORTANT NEW Free CATALOGS

. . . they're the cream of this month's crop . . . they describe latest methods and equipment.

Tell us which ones you want. Use the handy coupon at the bottom of the page.

If somebody beat you to it, there's another on page 244.

PIPELINES AND FITTINGS

Hydraulic Valves

1 You'll find valves for flow control, shut off and deceleration, relief, sequence, unloading, and counterbalance in this 28-page catalog. Drawings and cutaway views of valves; operational diagrams of piston designs. Rivett Lathe & Grinder Co.

Compressors

2 This 12-page catalog has much usable data on air compressors. Every compressor in a complete line handling from 1 to 90 cfm. is described by photograph, drawing and specification sheet. Quincy Compressor Co.

Centrifugal Blowers, Compressors

3 There's comprehensive data on centrifugal blowers and compressors in this one. Sections on applications data, design, drives, and engineering data. Its 52 pages are packed with drawings, tables, and charts. De Laval Steam Turbine Co.

Asbestos Packing

4 If you want to know more about braided and twisted asbestos packings, try this one. It lists standard sizes, specifications. Pictures and service recommendations for each type. Eight pages. Raybestos-Manhattan, Inc.

Industrial Expansion Joints

5 Complete data on industrial expansion joints are available here. Has 40 pages of features, sketches, specifications, and engineering information. Tells how to select, install, and use them. Twelve pages of design tables. Solar Aircraft Co.

Sludge Pumps

6 Here are 16 pages on plunger sludge pumps. There are sections of pumping data on problem liquids and information on industrial waste treatment, with engineering data on the whole series of pumps. Motor selection charts, lubrication information, facts on general-duty diaphragm pumps. Ralph B. Carter Co.

Safety Valves

7 This catalog shows you how to get the best protection from your safety valves. Charts tell you capacity needed to give you 100% protection if your pressure-reducing valve fails. There's also a gas volume-weight conversion table, safety valve specifications, drawings. Sixteen pages. Marine & Industrial Products Co.

DUPLICATE COUPON ON PAGE 244

MAIL THIS COUPON FOR FREE CATALOGS *(Good until Jan. 31, 1952)*

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AIR CONDITIONING . . page 238
MATERIALS HANDLING 238
ELECTRICAL EQUIPMENT 240
MISCELLANEOUS 244
PLANT ENGINEERING 246

TIPS TO GOOD HUMAN RELATIONS for factory executives

By M. J. MURPHY • Industrial Relations Editor, FACTORY

COMMUNITY PROGRAMS THAT GROW

There's no lip service in the community relations thinking of E. T. Price, president of Solar Aircraft Company, San Diego. He believes in setting up sound community projects, and then interesting community leaders in taking them on as civic activities. As he does it, it really works. Here are some of the things he's started in San Diego: "Little League" baseball, soap box derby, Junior Achievement, a junior manual training program, and, for adults, safety and craftsmanship contests.

The junior manual training program illustrates how good community relations plans spread. Price started it some two years ago (see FACTORY, Sept. 1949, p. 124). At first, it was for sons of Solar employees. Youngsters took courses in woodworking and auto repair right in the plant. Next summer more children asked to get in, some not in Solar families. This year, even the girls are in, with homemaking classes run by the local public utility.

Now the plan is no longer Solar's. The whole community is in on it. "Graduation" is to be signaled by a complete civic observance.

NOTHING'S FREE ANY MORE

This is hardly a "tip to good human relations." But it's a good human reaction story. So here it is anyway, just as it appeared in *The Bee-Hive*, the fine magazine put out four times a year by United Aircraft Corporation, Hartford, Conn.:

"We have a story from Texas, that, for a change, fits almost any part of the country. The story illustrates how the American people are resigned to paying for almost everything.

"A man in Dallas came in to see about Chance Vought Aircraft's machine shop training course, and during the interview the matter of compensation came up.

" 'The pay rate will be $1.20 an hour, plus 11 cents for the cost-of-living bonus,' the interviewer said, in explaining the wage scale.

"The applicant sighed, then reached reluctantly into a pocket of his jeans and inquired, 'Do I pay you now, or later?' "

NEW QUIZ ADDS INTEREST IN MAGAZINE

H. J. Heinz & Company, Pittsburgh, knows everybody loves a quiz. So, for its employee magazine, *The 57 News*, Heinz has developed a novel little "Quickie Quiz," based on news actually carried in the magazine. Here's how the company describes it:

"Just to check your own memory, try this short quiz, in which every question listed has received coverage during the past year or in this edition. The questions are distributed so that every member of the company — office, warehouse, factory employee, etc.—has an equal chance to make a favorable score."

The quiz makes an attractive full-page spread. Drives home important information about the company that every employee ought to know. Net profit, important product developments, new employee benefits, for example. Easy for any company to do.

DOES TESTING COST TOO MUCH?

That's the pointed question the Psychological Corporation asks in its September *Test Service Bulletin*. The "Psych Corp" should be able to throw some light on

the problem. It's had a wealth of experience over many years in setting up and evaluating programs.

In sum, the answer is, No; testing doesn't cost too much. Here's how the Psych Corp reasons:

"Training costs are higher than many businesses realize—as much as $700 for a mechanic's helper, from $400 to $800 for bookkeepers. . . .

"Let us suppose that without using tests we can expect that half, or 5 out of 10, of a group of newly hired people will prove satisfactory, and that selecting *with* tests 7 out of 10 will turn out to be satisfactory. Let us also suppose that we have to test 20 people to find 7 who meet our minimum required score. Now to get 7 'satisfactory' employees without tests, we hire and train 14. With tests, we test 20, hire and train 10. Looking only at training costs, we have saved the expense of training four people at, say, $500 each. That is $2000 of savings, or $100 per person tested."

NEW SAFETY MAGAZINE OUT

Safety Standards is the name of a new magazine published by Uncle Sam. First issue came out in August. The aim is to cover news of techniques and developments in state, federal, and private fields.

Looks good. Future plans promise worthwhile special features or general interest.

You can get on the mailing list by writing to: William L. Connolly, Director, Bureau of Labor Standards, U. S. Department of Labor, Washington 25, D. C. No charge.

WHAT TO DO ABOUT "FRIDAY AFTER THANKSGIVING"

"Friday-after-Thanksgiving-itis" is a disease second only to the bubonic plague in its effects. At least that's the feeling of those who have to get production out, when the "Black Friday" comes along. The shop may be half empty, but every absentee was sick—and can prove it.

What to do? Many companies have tried the standard device of denying Thanksgiving Day pay to employees absent the day before and after the holiday. Trouble is, you can't deny pay to those legitimately ill. But what's legitimate? Tough to decide these days of often miraculously easy doctors' certificates.

Glenn L. Martin, Baltimore aircraft manufacturer, has another solution: When you decide you want to sweeten up the holiday kitty, pick Black Friday to add to the list. That's just what Martin has done. Friday after Thanksgiving is the company's seventh paid holiday.

We're not suggesting more paid holidays just to get out of a hole. But, if you can make a good trade in bargaining, there are lots of worse things than having a holiday on a day that was half holiday anyhow. Shouldn't cost too much for that reason, either.

CONDENSED GUIDE TO LEADERSHIP

Looking for a short set of reminders on leadership for your foremen and supervisors? If so, here's one that may do. It comes from Hugh L. Thompson, manager, The Hawk and Buck Company, Inc., Waco, Tex. He says:

"Better results through better leadership was our problem. Real good leaders were scarce as pin-up girls in FACTORY.

"We have a number of department heads and supervisors, and we wanted to help them. But how? We searched for a simple formula that they could understand and apply daily to their jobs.

"Here's what we came up with—easy to remember, but not always easy to follow—leadership condensed to six points:

- Sustained enthusiasm.
- Thorough knowledge of job.
- Encouragement of those you lead.
- Fairness to all.
- Explicit instructions.
- Firm discipline if instructions are not followed."

MANAGEMENT SUGGESTION SYSTEM

Some unions notwithstanding, management men are human, too. They like recognition for their ideas. And they're often reluctant to present them in the course of ordinary business. Result is that some companies now have special suggestion systems for these technical, administrative, and supervisory men. Among the companies is Ford, with its Management Proposal Plan. The plan has been in effect for about two years—time enough to see how it's working.

Here's what Ford reports: In 1950 more than 31% of the company's management men turned in proposals. And more than 7000 of these men have come up with acceptable ideas. Of all proposals, 40% have been adopted.

The awards? Here Ford has been wise, indeed. There's no cash involved. Those whose ideas are adopted get a personal letter of commendation from their plant managers. This is made a permanent part of the men's personnel records.

Doesn't sound like enough? Perhaps, but don't forget—it's obviously working well.

Six Ways to Make Firefighter Training Stick

1

MAKE 'EM SEE, HEAR, FEEL, SMELL, AND TASTE, FIRE

Fire can be a pretty abstract thing unless you've actually tangled with it. There's no good substitute for putting your finger on a hot stove.

Teachers, you know, say "we remember **best** the things most recent; **longest**, the things most stimulating; but **best and longest**, the things that appeal to the greatest number of senses—and in which we participate most heartily."

If that's so, then it ought to be easy to train people to be better firefighters. That's because the only good way to train firefighters is on a participation basis. And certainly this kind of training will appeal to all five senses—seeing, hearing, feeling, smelling, and even tasting.

Remember, most of the men you recruit for your plant fire brigade are new to fire. Make them see, hear, feel, smell, taste it.

Make your drills so realistic that your firefighters will immediately recognize the sickening smell of burning insulation of a shorted wire. So they'll **see** the arcing transformer so vividly that they will instinctively cover their eyes to protect them from the white-hot sparks. So they'll **hear** the crackle of flames in baled excelsior. So they'll **feel** the tremendous heat of burning oil. So they'll **smell** and even **taste** the acrid smoke of burning sulfur.

If the subject for the day's training period is gas masks, make it real. Burn a few sulfur candles in a closed room. Have each firefighter don a mask, test it, and walk into the room. After he emerges, let him take a whiff so he'll always recognize the odor.

2

TAKE THE MYSTERY OUT OF FIRE

The bell ringing, the siren blowing, the panic we associate with fire—all conspire to make it something of a mystery. Your job, in training your firefighters, is to take out that mystery.

Fire is a "triangle." It must have these three ingredients:

- ►Something to burn (the fuel)
- ►Source of ignition (temperature hot enough to ignite the fuel)
- ►Oxygen (in the air—everywhere except in a vacuum)

Show your firefighter trainees—by charts, exhibits, and actual demonstrations—that, if you remove any of these, you have no fire.

You can also demonstrate dramatically that there are **three** ways to put out any fire:

- ►Cool the burning substance below its burning point by water or other means.
- ►Exclude the oxygen in the air by smothering the fire by foam, dry compound, etc.
- ►Remove the fuel by separation.

Be sure all your employees, especially your firefighters, know what makes a fire. If they do, then they also have a basic understanding of how to prevent fire—or put it out if it breaks out.

Unsell 'em on the idea that fire is inevitable. Disabuse 'em of the notion that so-called fireproof construction won't burn.

Fire is no respecter of plants. Every plant needs trained firefighters. And here are six simple ideas any plant can use to turn out a good fire brigade and keep it on its toes. They're from National Fire Protection Association, 60 Batterymarch Street, Boston 10. If you want further information, get the Association's "Industrial Fire Brigades Training Manual." Price $2.

3

MAKE INSPECTIONS THE KEYSTONE OF YOUR FIRE DEFENSE

Ability to recognize a hazardous condition promptly is just as important as fighting the actual fire. Periodic inspections are an essential part of your fire defense. They are vitally important if you want people to feel your plant is a good place to work.

The only way to put fire safety across with a worker is to convince him what a fire means to **him,** to **his** job, and to **his** pay envelope. When the firefighter makes his inspection and sees a hazardous condition, it's easy for him to speak to his fellow workers about it. He can show his area workers how to recognize hazardous conditions or other deficiencies in fire protection. He can preach the vital necessity of reporting them promptly to the foreman.

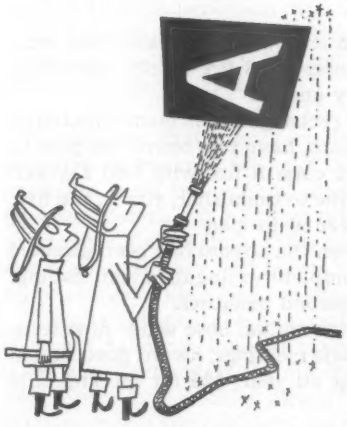
Here's how one New York manufacturer handles fire inspection: The plant gets a complete check every Monday morning. Instead of a few men making the check, about 100 men (all members of the fire brigade) make the inspection of their own areas.

It takes only 10 minutes, yet every square foot of the plant gets a close check. Sprinkler valves, location and condition of firefighting equipment, housekeeping, storage areas, exits are all checked. If anything isn't OK, "steps" are taken right away.

That's not all. Once a month the fire chief and the foremen hold a round-table discussion to review inspection findings. Participation in this plan by all employees is made possible by strategically located suggestion boxes. Prizes are awarded for the best suggestion.

4

MAKE YOUR DRILLS REALISTIC



Just rolling out firefighting equipment against the clock won't hold the interest of your fire brigade long. The more realistic you make your drills, the more interested your men will be. And they'll be better equipped to fight fires if they ever break out.

Fires are often identified with letters to indicate what's burning:

A for fires in ordinary combustibles like wood or paper.
B for flammable liquid fires.
C for electrical fires.

In your drills, try placing large red cardboard squares, lettered **A, B,** or **C,** to indicate hypothetical fires. For instance, put a **B** card near a dip tank to indicate an oil fire. A **C** card on a motor to indicate an electrical fire. Or an **A** card on the ceiling to indicate spread of the fire to combustible stock on the floor above.

Try using card symbols to show firefighters whether the fire has spread to other parts of the plant. Make sure they use the right kind of extinguisher for each fire. See that ventilation and salvage techniques are carried out, or simulated as closely as possible. Station a man at the sprinkler valve. It may later be a good idea to trip fire protective devices so brigade members will know exactly how they work and gain confidence in them.

Make sure your employees know how to call the city fire department immediately and notify gate guards that they are on the way.

More on next page

5
GET EVERYONE INTO THE ACT

Want to know one mighty good way to stop fires from ever happening? Show workers the hazards of their job. Teach them what to do if a fire breaks out. Get everyone into the act.

If the operator of a drying oven in a Pennsylvania plant had known more about the hazards of his job, he could have saved the company $100,000. How? Merely by shutting the oven doors and turning on the open sprinklers in the oven when a fire broke out. Instead, he ran for help. This gave the fire time to spread. A fire that could easily have been put out when it started—with little resulting damage—caused $100,000 loss. Why? Because the operator had not been trained properly. His fault? No. The company's fault.

Fire brigade members can instruct fellow workers in their own department about fire control. It will help make the line workers think they're "on the team." Workers should be warned against:

- Leaving their machines or processes unattended.
- Sneaking a smoke in their work areas.
- Leaving the source of ignition—glue pots, heaters, etc.—going when they leave for the day.
- Breaking good housekeeping rules—throwing oily rags in the corner, not putting waste in receptacles provided.

Be dead sure every employee knows how to operate plant and public fire alarm boxes. Knows the closest one to his workbench. Knows where the nearest fire extinguisher and hand hose are—and how to operate them efficiently.

6
KEEP COMPETITION KEEN

Interdepartmental contests are old stuff. But they have a direct appeal to everyone in the plant. Try one as part of your firefighting training. Use a plaque that can be awarded to the department showing the greatest improvement in its housekeeping.

Or try the same idea in reverse. Rig up a disreputable dummy. He wears a sign about his neck that says he lives in the "dirtiest" department in the plant.

Such competition transforms an irksome task into a pleasant one. It works as well with the members of the fire brigade as it does with the other employees.

Contests between fire brigades from various plants have been conducted to help create and maintain interest in fire safety, especially among the firefighters themselves. Try one.

When your fire extinguishers need recharging, let teams discharge them in plantwide contests. For instance, have two teams compete to see which will be first to extinguish a class B fire with two 2½-gal. foam extinguishers. The job is to get the extinguisher, run to the fire, and put out the fire burning in a 36x36x6-in. pan.

Timing starts at the gong. Ends when the stream has been directed away from the fire. Flashbacks, incomplete extinguishment, falling, and premature discharge result in 5-second penalties.

You can hold similar contests with the annual hose water flow tests.

To stimulate attendance at fire brigade meetings, award government bonds—$50 for not missing a meeting all year, $25 for missing only two meetings.

JOE'S DEPARTMENT

FOR BETTER ELECTRICAL SERVICE

By JOE ST. ANDRE • Electrical Editor, FACTORY

• ARE YOU USING YOUR ELECTRICAL DEPARTMENT TO FULL ADVANTAGE?

If you aren't, you're making things tougher for yourself as a production executive. And you're making it tougher for the electrical men to do a tip-top job.

Let's take the second point first—helping the electrical department do a better job.

Don't overlook the fact that electricity is doing more work than ever in your plant today. Electric controls are more numerous, more complex. Machines are running faster, making electric drive problems tougher. On automatic and semi-automatic machines the electrical circuits are real jimdandies.

In short, a lot of the skill it used to take to run your plant is now built into the electrical equipment. So, for heaven's sake, call your chief electrical engineer or foreman in *early* on plant planning, layout, machine purchases, and operating procedures. Listen to his advice; he's got to make the stuff work later.

In large plant organizations, there's little question about the importance of the electrical man. Yet even in some large corporations, the electrical department is called in last on planning. The plant engineer says: "Joe, you have no problem. All you have to do is to run a few pieces of conduit, some wires, and you're in business. Switchgear? Let's put that down in the basement, out of sight so that even the electricians will forget where it is located. Room is too valuable on the main floor. Besides, the layouts have been approved by the plant manager, the production manager, the manufacturing superintendent, all the line foremen, myself, the boss janitor, and the personnel director."

Everybody gets in the act except the poor electrical engineer—who will hang the first time the plant has a power failure.

Equipment that's not readily accessible will never be maintained. Why not let the electrical department in on the original planning and layouts? Give your electrical engineer a little consideration as to space and location of his equipment. Remember how important he'll become the next time the wheels stop turning because there's no power.

Too often, electrical equipment is "fitted in" last. It would take too long to make any changes in layouts and then start the approval procedures all over again. This usually means that the electrical engineer burns the midnight oil, makes hasty decisions and installation plans which may not represent the best way of doing things. He comes up with something that fills the bill and on time. He knows it's unforgivable to have equipment waiting on the floor with no power available to operate it. But this is a wasteful way to do business!

Now, then—what can your electrical men do for you, if you let them?

Well, have you or your plant people been saying: "Where can I get electrical equipment?" Do you check with your electrical men in matters of procurement?

Almost every electrical engineer today has contacts throughout the electrical field. These contacts may be salesmen, engineers in other plants, fellow members of engineering societies, little electrical manufacturing plants, and repair shops. Your engineer may be able to locate equipment for you.

Equipment is disappearing from the market. It is no longer a question of designing the most economical system, but "What can I get my hands on?"

Shortages may force you to curtail plans for the future. In the past, it was sound economics to plan for future needs when putting in new plant or remodeling your electrical systems. Today you should ask your chief electrician to get you what you need for your needs *right now*. But let him in on your plans for the future so that he can in turn make his designs to take care of you later on.

Your electrical engineer can make provisions to expand in, say, 1953 by using his experiences of World War II.

We made many mistakes in designing distribution systems in those days. They cost many dollars after the war—when the facilities we'd wanted became available. Let's use these mistakes to solve our present problems of shortages in electrical equipment.

For instance, design your sub-stations so that your incoming feeders come in on the end of the bus bars. Later on, you can expand the capacities of the station by installing another feeder and another length of bus bar. In this way, you can cut down the size of the copper bars used on the present installation. Install switches wherever you may expect to add to the installation at a later date.

At Wright Aeronautical, where I worked, it was possible to add an extension to the main sub-station, install circuit breakers, metering transformers, etc., with no interruption to power supply in the original sub-station—simply because we had provided a disconnect switch on the end of the

JOE'S DEPARTMENT

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high-voltage bus. In these days of stepped-up production, outages for alterations to power systems are not looked upon with favor by management.

The same applies in a smaller degree to bus duct runs and conduit runs throughout your distribution system. Put in conduit runs for your immediate needs and no more. A switch here and there will enable you to take care of additional future expansions without the fear of asking for shutdowns to tie in the new services.

Let your electricians give you the facts of life on instruments.

If you can't get them now with your new switchgear, make sure that the manufacturer makes provision so that they can be added later. Polyphase watt-hour meters cannot be operated on single-phase current transformers. The same holds true for potential transformers.

During the last war, I was handed switchgear in large distribution sub-stations with single ammeters for load indications. No potential transformers were installed.

When the shooting was over, the plant engineer called me in one day and said: "The boss wants us to start in checking power loads in the various departments." With what?" says I. "That's your problem," says he. Of course, he was right. After much head scratching, the answer came up in the form of portable polyphase wattmeters used single phase with potential coils hooked up to lighting circuits. Not a very accurate way to measure power, but the only way open to us, in view of the failure to provide the proper facilities in the first place.

But the worst feature was that we would not have been able to install the proper instrument transformers even if we could have bought them. The sub-stations could not have been cut out of service for the length of time necessary to make the bus changes. How nice it would have been if the manufacturer had installed removable copper sections in the bus structure so that a few bolts would have enabled us to install the necessary equipment.

In planning machine layouts, be sure to give consideration to the electrical facilities required.

I was given a large automatic welding machine to install. The original plans called for the installation at the far end of our bus duct runs. Not only would that require a long additional feeder run from the sub-station, but the introduction of the heavy current demand on the power circuits would have created voltage fluctuations. We had just spent considerable money for voltage regulators in that particular section, but they would have been unable to handle the fluctuations. After weeks of battling, I convinced my management that the equipment should be moved adjacent to the sub-station and a separate transformer installed to take care of this one load, thus removing the load from our main power distribution system. If the management had failed to back me up against the cries of the production people (who wanted to stick to the original layout), we would have had all sorts of trouble with voltage conditions and used up a great deal of copper in our feeder lines.

Or take the case of the foreman who wanted his office located in a spot where it was next to impossible to provide 120-volt service for adding machines, typewriters, desk lamps, etc. I think perhaps his main reason was to get a better look at Mabel, the beautiful blonde across the aisle. We cannot afford such luxuries during these times. Management should listen to the arguments of the plant electrical department and back them up if sound.

When you are thinking of buying a piece of equipment, get the electricians' advice on the electrical part.

Say your plant has 440-volt power distribution. Some furnaces you are buying are for 220-volt operation. The salesman swears by all that is holy that they can't be furnished in any other voltages. Do you call in your electrical man to argue the case, or do you depend on your purchasing department or production department personnel to decide? Then when the equipment comes in, does management scream about the cost of a new transformer to get the 220 volts? The time to decide power requirements is before you buy the equipment. The national need for conservation demands that you use the facilities of the electrical department in the buying of your machine tools, furnaces, and process equipment.

Let the electrical department help conservation in another way—by standardization of equipment.

Have you any idea of the amount of spare parts which have to be carried in your stockrooms because your purchases of machines do not specify the type of electrical equipment which is to be furnished on the machines? Limit the choice of the manufacturer to a few brands on such things as motors, controls, timers, etc.—and consult your electrical men as to their preference. Equipment already in the plant is the main basis for such preferences. If you don't set up such controls, then don't be surprised at large orders for spare parts, which, during shortage periods, may not be available. If we are to have enough spares to keep American industry operating for the next two years, then industry had better think of standardizing the various equipment in the plants so that there will not be stock piles in some plants while other plants are wanting for the same material.

You are going to say: "All this advice doesn't apply to my plant. It must be the fellow next door." If I were you, I'd want to know if the shoes fit.

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They ASSURE high maneuverability of trucks . . . rapid, accurate handling of material. PROVIDE uniform rate of material handling with no unscheduled down time. SHOW lowest costs of operation, maintenance, repair, depreciation . . . inherently safe. Call in an Exide representative, and let him prove these facts.

THE ELECTRIC STORAGE BATTERY COMPANY
Philadelphia 2

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"Exide-Ironclad" *Reg. Trade-mark U. S. Pat. Off.*

MAINTENANCE POINTERS

FOR PLANT OPERATING EXECUTIVES

An easy way to change batteries suggests . . .

. . . You Can Cut Maintenance Costs by Better Handling Equipment

This picture should teach us all a lesson. As a time and labor saver, Canada Dry (Detroit) uses rollers in the beds of its fork lift trucks and on battery charging tables.

Two roller-top tables, just the height of the truck bed, are bolted to the floor at the battery charging stand. There's space between them for the truck.

When the truck backs in, a charged battery from one table is rolled onto the truck, pushing the used battery onto the other table. One table is always empty, the other holds a battery on charge. Removable stop bars on tables and truck keep the batteries in place.

It's a neat trick. But it also can give you other ideas. For instance: Are you sure you haven't any use for a section of roller conveyor, a chute, or a motor-driven belt loader? Check your operations, especially the repetitive ones—like battery charging—and you may uncover some time-saving, hence money-saving, possibilities.

Are You a Tradition-Bound Plant Engineer?

We met a man the other day who set us to thinking about this very question. "Trouble with most plant people—" he said, "they're too steeped in tradition. They know only one way to do a job, and they keep on doing it that way the rest of their lives. They never look for better methods to do the job, or better materials to do it with—so you never get any improvements."

"Here's what I mean," he continued. "I'm blind as a bat in my right eye—can't see the side of a barn with it. Now, I had my good eye examined recently. The doctor said I needed bifocals. So I asked him to give me a full lens prescription for each condition. I told the oculist to make up two separate lenses and to put the right-eye lens in backwards.

"See why? All I do when I want to read is turn my glasses around from right to left or vice versa. This nosepiece of mine clamps on my nose either way. But do you think that dumb oculist caught on? No siree. He refused to take the job on the grounds he had never seen it done that way."

Well, we laughed at this story. But we'll never forget it, especially when tempted to say, as all engineers are: "You can't do it any other way."

Cold Weather Is Coming — Keep Down Your Heat Losses

One way of trimming fuel costs, says The Magnesia Insulation Manufacturers Association, is to check the insulation on all heat-carrying lines or equipment exposed to the weather. Also, you may save yourself some freeze-ups.

It suggests an insulation survey of your plant along these lines:

1. Are all pipelines insulated? Perhaps you extended some hot-water lines to another building. Or perhaps you ran new steam or condensate lines outdoors, or in open areas such as ramps or loading platforms.

2. Are you using adequate thicknesses of insulation? The rule is to apply ½-in. thicker insulation than you would use for the same lines indoors.

3. Is insulation properly protected against the weather? Weatherproofing is important. You can protect insulation on pipelines with asphalt-saturated asbestos roo fing felt. You can cover insulation on flanges, fittings, and valves with an asphaltic plastic coating.

4. Is the weather protection in good repair? Inspect insulation jackets for holes, torn or loose laps, loose or broken wiring, or other faults. Seal up all cracks or dents to keep water out—waterlogged insulation isn't money-saving insulation.

More on page 146

EVEN OUR COMPETITORS' BEST CUSTOMERS INSIST ON SUNOCO WAY LUBRICANT

In the competition for industry's lubrication business, all refiners are constantly improving their products. Every so often, one company or another finds a way to make a petroleum product that, for a particular use, licks to a standstill anything its competitors can offer. Immediately the others dig in and try to find the secret. Until they succeed, the originator's ingenuity pays off in a rising flood of sales.

That is the happy position in which Sun Oil Company finds itself with its Sunoco Way Lubricant. Since its introduction eight years ago, no other refiner has been able to match this tableway lubricant. Here is proof any man in metalworking can appreciate:

Sunoco Way Lubricant is insisted upon by 188 metalworking concerns which buy all their other lubricants from our competitors.

In other words, our competitors have loyal 100% customers, just as we have; but when it comes to tableway lubrication, loyalty goes out the window and Sunoco Way Lubricant is specified.

The reason for the success of Sunoco Way Lubricant is that no one has been able to equal it for *protection of tableways . . . ability to prevent "stick-slip" . . . prevention of table flotation . . . resistance to wiping off or squeezing out under heavy loads.* These benefits add up to higher production, better finishes, lower maintenance costs, longer tool and machine life. That is why Sunoco Way Lubricant is approved or definitely recommended by 38 of America's leading machine tool builders.

Want to see factual case histories and learn more about this product? Send for illustrated booklet, "Sunoco Way Lubricant." Samples are available, too, to companies in the metalworking industry. Write Dept. F-11.

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SUNOCO®

MAINTENANCE POINTERS

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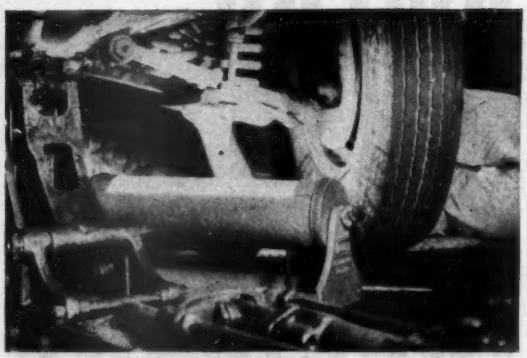

Repairs are faster and easier when you use . . .

. . . A Portable Trouble Light That Doesn't Glare

Did you ever tackle a repair job around the house and need a trouble light?

So you rigged up a home-made extension cord and lamp. Oh yes, you made sure the cord was safe from shocks and grounds. But I'm willing to bet you ran into trouble with your make-do in two ways. First, you couldn't spot the light just where you wanted it. Second, you couldn't see the job too well for the glare. Then when you tried to shield the glare, it shut off needed light.

Now picture the maintenance man in your plant trying to work on a ticklish job like that. You get the idea? It isn't his fault when poor lighting slows him up and runs up repair costs, down-time charges, and blood pressure.

Check your trouble lights today. Make sure you have enough to go around. Look over the latest models. There's a filament flood type, for example, that rides on casters and can be spotted anywhere on a hemisphere. But if you're working in close quarters where you are likely to have glare trouble, try a fluorescent lamp like the one illustrated. It uses a 15-watt lamp, protected by a plastic cover. Illumination is about 100 foot-candles at forearm distance.

A Help for Training Maintenance Electricians

Have you seen the booklet *Protective Maintenance of Motors and Generators?* It's published by the Renewal Parts Section of the National Electrical Manufacturers Association, 155 E. 44th St., New York 17.

This booklet is intended for the use of maintenance men in the electrical industry. It is offered as a ready reference for the handling of everyday problems common to electrical rotating machines.

"Much of this information," says NEMA, "has been published many times and in many forms. But it bears constant repetition. An appendix of some NEMA parts standards should facilitate the work of those engaged in repair and maintenance of motors and generators."

You can buy single copies at 50¢ each, postpaid, from NEMA.

Latest Tips From the Editor's Notebook

Do you use tap water in your storage batteries? Then watch out for trouble if the water utility starts adding fluorine to prevent tooth decay. You can avoid trouble with an inexpensive still—20 gallons per day capacity. It'll forestall battery breakdowns.

If you want to protect steel storage tanks from corrosion and abrasion, investigate Vinylite resin coatings. One company's solution for big oil tanks with floating decks was a 5-coat system, starting with a metal conditioning coat and an anti-corrosive primer.

How can you lubricate bearings in hot ovens? One company—The Industrial Ceramic Products Co., Columbus, Ohio—uses Ucon oil with an Acheson colloidal graphite dispersion additive. It forces this mixture into every bearing of its kiln cars on each trip.

Take a tip from the aviation boys: Identify your plant service pipelines clearly with pressure-sensitive labels that are heat- and humidity-proof, says E. Z. Code Division, 600 E. 2nd St., Los Angeles.

Do your workers sometimes break windows when they toss tools on the window ledge? One plant stopped the breakage by using acrylic plastic sheets for the lower run of panes. No more trouble.

How can you dry things fast without high heat? Carrier Corp., Syracuse, N. Y., tells how its Humidrys saved water-soaked library documents. In one week these dehumidifiers absorbed 500 gallons of water from recirculated room air.

To get high d-c potential, don't overlook selenium rectifier stacks. Westinghouse Electric Corp. uses this power pack to get voltages up to 100 kv., even under corrosive conditions.

Turn to page 246 for good ways to solve special plant engineering problems

DESIGNED AND MANUFACTURED BY THE WORLD'S LARGEST USER OF WELDING AS A PRODUCTION TOOL

A.O.Smith

RECTIFIER-TYPE, NEMA-RATED

D-C WELDER

Available in 200-, 300- and 400-amp. models

★ **Field-Proven SUPERIORITY**

★ **Heavy-Duty Precision Construction**

★ **D-C Welding at Lower Cost**

In this new A. O. Smith welding machine you get higher efficiency at lower initial cost and reduced maintenance by comparison with motor generator sets.

The A. O. Smith D-C rectifier-type welder stands up under heavy service because it is *properly cooled* by high-velocity, directed down-draft ventilation. No overheating of selenium stacks is possible in regular heavy-duty service.

The three-phase coils in the A-C circuit are of heavy copper and precision layer-wound, providing full NEMA-rated output with minimum line load. Amperage control in stepless stages is effortless . . . *ball-bearing jacks* smoothly raise and lower the primary coils.

A sturdy, weather-proof case provides complete protection from weather and dust, in shop or out.

Ask your A. O. Smith distributor, listed below, to demonstrate . . . or write direct for information.

A. O. Smith Corporation
Welding Products Division, Dept. FM-1151
Milwaukee 1, Wisconsin

77th ANNIVERSARY 1874 - 1951

A.O.Smith
WELDING PRODUCTS
Made *by* **Welders . . .** *for* **Welders**

Ask the A. O. Smith Welder Distributor Near You for a Demonstration

Pacific Metals Co.
Los Angeles, California

Pacific Metals Co.
San Diego, California

Pacific Metals Co.
San Francisco, California

Western Oxygen Co.
Denver, Colorado

Dixie Gases, Inc.
Atlanta, Georgia

U. S. Steel Supply Co.
Chicago, Illinois

Universal Welding Supply Co.
Chicago, Illinois

H. R. McGarvey
Pekin, Illinois

Mineweld Co. of Indiana
Indianapolis, Indiana

Acme Welding Supply Co.
Louisville, Kentucky

U. S. Steel Supply Co.
Baltimore, Maryland

U. S. Steel Supply Co.
Allston, Massachusetts

LaSalle Electric & Mill Supply Co.
Detroit, Michigan

Welding Gas & Supply Co.
Grand Rapids, Michigan

Jackson Welding Supply Co.
Jackson, Michigan

Wolverine Gas Products
Saginaw, Michigan

U. S. Steel Supply Co.
St. Paul, Minnesota

U. S. Steel Supply Co.
St. Louis, Missouri

U. S. Steel Supply Co.
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Dixie Gases, Inc.
Charlotte, North Carolina

Queen City Supply Co.
Cincinnati, Ohio

Welding & Cutting Supply Co.
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Pacific Metals Co.
Salt Lake City, Utah

McJunkin Supply Co.
Charleston, West Virginia

Holt Electric Motor Company
Milwaukee, Wisconsin

U. S. Steel Supply Co.
Milwaukee, Wisconsin

maintenance data 182 sheet

How to Get the Most Out of Your Fiber Rope

Prepared from material supplied by **STEPHEN A. REED**, Field Engineer, Plymouth Cordage Company, Plymouth, Mass.

1. SELECT THE RIGHT ROPE

CONSTRUCTION · Construction of rope has a decided effect on all its properties—especially on tensile strength, abrasion resistance, and flexibility. Rope is made by twisting a number of fiber yarns into a strand, and then twisting three or more strands to complete the rope. Usually the yarns are twisted to the right (clockwise), and the strands to the left (counterclockwise). The relation of the twist in the strand to the twist in the rope is called the lay. It can be made hard, regular, medium-soft, soft, and extra soft.

A hard rope has less strength but resists abrasion better. A soft rope handles easily, but distorts easily and abrades more readily. A regular rope is best for general-purpose uses. But if you should need any one particular property, be sure to consult your supplier for the quality and construction best suited to your needs.

MATERIALS · Ropes are made of natural fibers (such as manila, sisal, hemp) and synthetic fibers (such as nylon, Fiberglas). Natural fibers are subject to attack by cellulose-digesting micro-organisms which thrive in wet and hot atmospheres. Synthetic fibers are not so affected.

Manila is one-third stronger than sisal, and has better all-around qualities than any other fiber. Ropes of natural fiber are OK for general-purpose use in average plant atmospheres.

Don't use any fiber rope in high temperatures, such as in handling molten metal ladles. Use only Fiberglas for temperatures above 250 and below 900 degrees F., making due allowance for loss in tensile strength as the temperature goes up. At normal temperatures Fiberglas has a high dry-tensile strength (twice that of manila), but its flexibility and abrasion resistance are relatively poor.

Nylon has 1½ times the tensile strength of manila, but about four times its working elasticity. Nylon is therefore good for shock loading, but too elastic for many other uses.

Don't use a fiber rope reinforced with metallic strands, or wet rope, for electrical work, or when working in areas near open power lines.

SIZE · Overloading a rope cuts rope life. Although you order rope by size (thread, circumference, or diameter), you really want strength. Always consult the manufacturer's table of rope sizes and strengths to make sure you are getting the right size, and not rope that's too small.

In new rope, good practice allows a factor of safety of 5 to 1; i.e., you are safe in choosing a minimum breaking strength of rope five times the working load. After six months' ordinary use, double this factor to 10 to 1, even if you see no signs of wear. For rope that shows signs of abrasive wear, damage from exposure, or that has been much used under heavy strain, regardless of time used, you boost the factor of 5 by 1½, 2, or 3 times, depending on its condition. Don't use a rope that shows serious flaws or damage. Destroy it to prevent the danger of other misuse.

2. USE THE RIGHT ACCESSORIES

PULLEY BLOCKS · Strength of the block usually determines the load limit. If the block can take it, a good rope always will. For a given size of pulley or sheave, a good rope is stronger than the block.

Use the largest diameter sheave practicable. A larger diameter means less internal rope friction, greater rope life. Too sharp a bend is the main cause of rope wear. Also, a block with too little clearance rubs against the rope and abrades it.

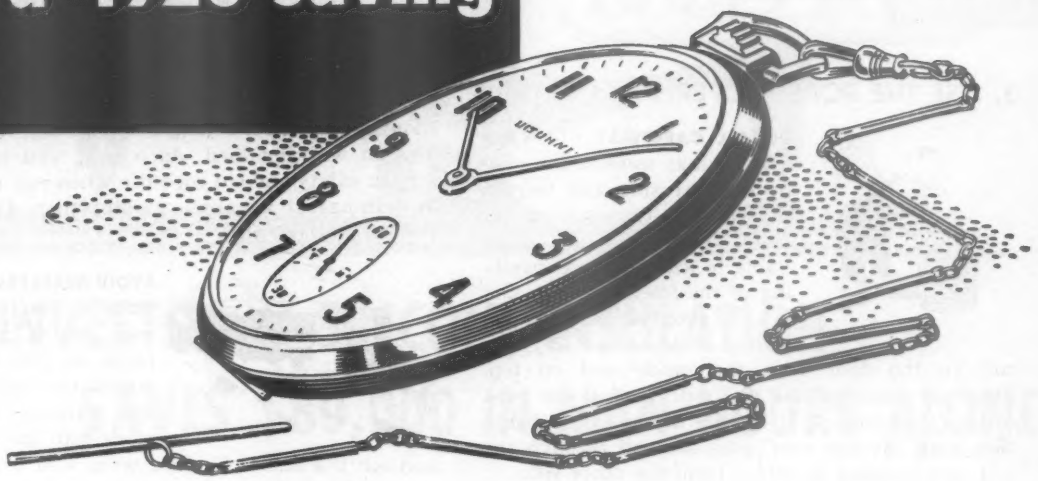
SPLICES · Don't ever join ropes permanently by a knot, if you can avoid it—always splice them. A well-made splice retains as high as 95% of the strength of the rope. A knot is only about 50% efficient, and may result in sudden failure.

Don't use the easy-to-make but bulky "short splice" to connect rope used in pulley work, or where its added bulk would cause serious chafing or wear. Instead, always use a thin "long splice" designed for such service. Short splices are best for slings. A companion "eye splice" is best for permanent ring fastening or fastening around a block.

Always bind or "whip" the free ends of a rope (or separate strands) to prevent raveling.

Turn the page

Every Minute Meant a $1920 saving



Big return for a minute's time . . . but to a leading Philadelphia manufacturer* a 5 minute interview did result in a total saving of $9600.

This manufacturer faced a problem that's common to many plants today. His ten machines have 560 bearings—560 bearings that must be kept lubricated if production is to be kept uniform, rejects few. That lubrication job was taking four man hours every week and, because of human fallibility, there was always the potential danger that one of these many bearings had been overlooked or under lubricated.

An Alemite Lubrication Engineer was called in. He made his presentation in just 5 minutes—5 minutes that saved $9600. He told the manufacturer the facts of installing a modern Alemite Centralized Lubrication System. That system is in the plant today. The result: assurance of continuous, correct lubrication, few rejects and shut downs, and the addition of a whole hour's production time every working day.

Call Your Alemite Lubrication Engineer

No matter what size or type of plant you operate, Alemite can show you dozens of ways to save through the more efficient handling of petroleum products. Call your local Alemite Industrial Distributor now or send for the free booklet "11 Ways to Cut Production Costs." Simply attach the coupon below to your letterhead. Dept. G-111, 1850 Diversey Parkway, Chicago 14, Illinois.

*Name on request.

ALEMITE

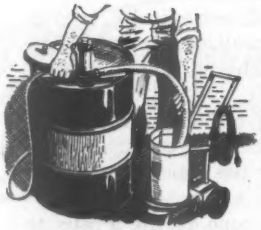
REG. U.S. PAT. OFF.

MEANS EVERYTHING FOR LUBRICATION

1. Methods 2. Lubricants 3. Equipment

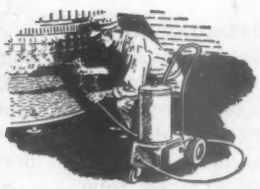
Another Product of Stewart-Warner

Alemite Cuts Costs 3 Ways



1. In transferring lubricants... cuts man hours 63% for every 100 pounds transferred. No mess, no contamination.

2. In loading grease guns . . . saves 3¾ man hours for every 100 pounds of lubricant loaded into hand guns.



3. In applying lubricants . . . saves up to 23.9 man hours for every 100 pounds of lubricant applied to bearings.

FREE! Valuable booklet—
"11 Ways to Cut Production Cost"
(Simply attach to your letterhead)
ALEMITE, Dept. G-111
1850 Diversey Parkway, Chicago 14, Ill.

We'll include facts on the new Alemite Oil-Mist System, too—(OIL-MIST atomizes oil into mist, circulates it to bearings under pressure. Increases life of bearings as much as 17½ times).

Name .....

Company .....

City ..... State .....

maintenance data sheet 183

HOW TO GET THE MOST OUT OF YOUR FIBER ROPE

Begins on page 148

3. USE THE ROPE PROPERLY

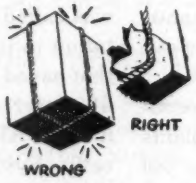
UNCOIL CAREFULLY · Like knots, kinks weaken the rope by overstressing and tearing the yarns at the short-radius bend. Wet ropes are more liable to kink because swelling of the fibers shortens the lay. To avoid kinks when uncoiling a new rope, lay the coil on the floor with the inside end on top. Then the center of the coil will unwind the rope counterclockwise. If it uncoils in the other direction, turn the coil over, pass the end through the coil, and proceed as before from the other side.

REEVE ROPE RIGHT · Proper alignment of rope in sheaves prevents chafing against pulley blocks. When either block of a pair has more than two sheaves, the hoisting rope (or fall) should lead from one of the center sheaves, to keep the strain on the center of the blocks. The two blocks will then be at right angles to each other. This prevents tipping of the block and damage to rope from cutting across the edges of the block shell.

KEEP ROPE IN BALANCE · In using a rope you are likely to twist or untwist it too much on its own axis. Too much twist shortens the lay of the strands, and brings on kinks. Too little twist lengthens the lay and causes the strands to twist more and harden. You then get a "long-jawed" rope of lesser strength. Watch the lay of a rope, and throw twist in or out as needed, to compensate for undue twist from use.

DON'T OVERLOAD ROPE · Overloading causes a rope to lengthen out and stretch, often resulting in permanent damage. Always allow for the condition of used rope when determining the safety factor. Instruct all users of rope as to safe loads for various conditions of load in pulls, fastening, or slings. You can get simple tables from any rope manufacturer showing the effect of angle of pull and number of legs on working load. As a rule, you jeopardize human safety and cut rope life when you use slings or lashings at an angle greater than 45 degrees from a straight pull.

AVOID NEEDLESS SURFACE WEAR · Don't drag a rope on the ground. It picks up grit and sand which not only abrade the surface but also work into the rope lays and cut the fibers. Surface wear also comes from dragging or rubbing one rope over another or over sharp or rough objects. Make sure cleats, winchheads, and other working surfaces are smooth.



AVOID SHARP BENDS · Sharp bends reduce the tensile strength of rope by putting extra strain on the outer fibers and breaking them. You can ruin a good rope by one oversight. Avoid tying or pulling rope over sharp corners—use pads of burlap or bagging between the load and the rope. Don't make a rope fast to a pole of small diameter.

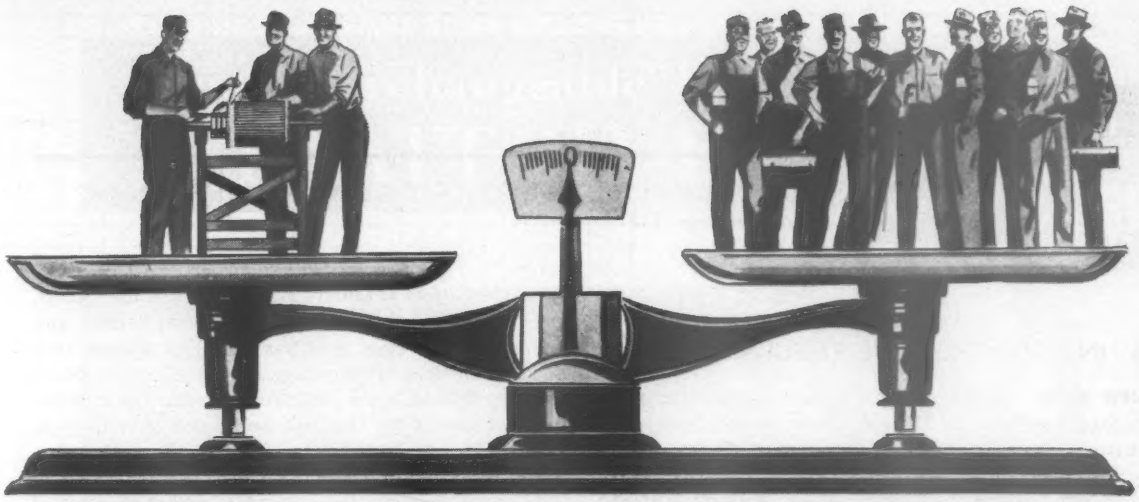
ADOPT LIFE-LENGTHENING PRACTICES · You can stretch the life of your rope gear by using it sensibly to avoid needless wear, exposure, or strain. Here are some examples:

Wear · Reverse the rope ends periodically, to even out the wear. If wear is localized at one point, change the length to the anchored point by periodical shortening.

Exposure · When cleaning buildings from scaffolds, keep the fall line away from the scaffold to prevent chemicals falling on the rope. Protect the portion above the scaffold by a canvas sleeve.

Strain · Slack off on a guy rope during a rain, to prevent overstrain because of shortening and tightening of the rope from wetting.

Turn the page



$370 INVESTED IN SILICONE INSULATION SAVES $80,000 IN MAN-HOURS ALONE

TRAVELLING CRANE MOTORS insulated with Class B materials had a normal life expectancy of only 20 days in a large southern foundry. At least 2½ to 3 hours were required to change motors. Down-time cost $1000 an hour in lost man-hours or $2500 for each failure. That amounts to over $40,000 a year in lost man-hours alone.

OVER TWO YEARS AGO, three crane motors, rated at 15, 30 and 50 hp, were rewound with Silicone (Class H) materials at an additional cost of about $370.00. Still in service, those Class H motors have already saved $80,000 in labor plus the cost of rewinding with Class B materials plus the value of lost production.

THAT'S TYPICAL of the performance of motors protected with Class H insulation made with Dow Corning silicones. They last at least 10 times longer than the next best class of motors. They also have at least 10 times as much wet insulation resistance. That's why more and more military and industrial engineers are demanding Class H equipment. That's why more and more design engineers are specifying Class H equipment. And that's why Class H is becoming more readily available from motor manufacturers and rewind shops.

WRITE, RIGHT AWAY

to DOW CORNING CORPORATION, MIDLAND, MICHIGAN

Please send me
- ☐ List of Class H Motor Manufacturers L-11A
- ☐ List of Class H Rewind Shops L-11B

Name_____

Title or Dept._____

Company_____

Address_____

City_____ Zone_____ State_____

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In CANADA: Fiberglas Canada, Ltd., Toronto • In GREAT BRITAIN: Midland Silicones, Ltd., London

maintenance data sheet 184

HOW TO GET THE MOST OUT OF YOUR FIBER ROPE

Begins on page 148

4. INSPECT THE ROPE REGULARLY

NEW ROPE · Always inspect new rope carefully before you use it. It may have been carelessly stored or handled after it left the manufacturer.

New, good manila rope is hard but pliant, with a smooth silky feel. Color is yellow, with a silverish or pearly luster. It should be clean and unspotted. A good sisal rope is yellowish-white in color, with possibly a greenish tinge, but no gloss. Hemp is softer than manila, and usually dark gray in color.

USED ROPE · Inspection schedule varies with the service, as follows:

1. Always inspect before and after each project.
2. Inspect daily when rope is used in chemical exposures.
3. Inspect monthly while in regular use.

WHAT TO LOOK FOR · Inspect the entire length of the rope, or you may miss the dangerous defect. Watch for signs of external and internal wear, overloading, and deterioration by the elements, chemicals, or micro-organisms. These all affect breaking strength.

External wear · Look for abrasions or broken or cut fibers on the outside. Rope with short protruding fibers points to loss of strength. When the surface threads are worn half-way through on small rope, discard it. On large ropes, with many more inside yarns, the cover yarns can be worn somewhat deeper before discarding.

Internal Wear · Look for variations in size or roundness of strands, suggesting torn or cut fibers. Check suspicious places by unwinding the rope and examining inner strands. Also look inside for a white powdery residue caused by grinding of the fibers. This occurs mostly in ropes that bend frequently under heavy loads.

Overloading · Look for wholly broken or partially shredded inside fibers. An overloaded rope tends to become untwisted and longer in the lay. To test a rope for strength, load it close to the ground with at least three times the expected load. Then follow up with a visual inspection.

Deterioration · Color of a rope is a good telltale. Chemicals or animal excretions will burn brown or rusty spots into rope. Watch for discoloration or dry rot. Cut out the damaged sections and re-splice the good sections. In general, a rope that has lost its luster, or is discolored and has a musty odor, isn't safe. If the inner yarns are clear, bright, and unspotted, the rope still has life. But a rope that has lost its feel of pliability or stretch, or appears dry and brittle, is suspect. To test, unwind an 8-in. piece of yarn from the rope and break it with your hands. If you can do this with little effort, the rope is unsafe. Discard it.

You can expect that a rope exposed to normal atmospheric conditions will deteriorate about 30% in two years, because of weathering alone. The loss in strength from wear must be added to this figure. In general, a rope in continual use will wear out before it is harmed by atmospheric exposure. Long hoist ropes accidentally damaged in one spot can be cut and spliced, or you can use the smaller sections for slings or tackle.

5. GIVE THE ROPE GOOD CARE

STORAGE · Don't store rope in a damp place. Dry rot may result. And you commit two crimes if you throw rope on the shop floor and cover it with other material that prevents air circulation. Best place to store rope is in a cool, unheated, dry room with free-air circulation. Place the rope in loose coils on open grates high above the floor, or hang it on wooden pegs.

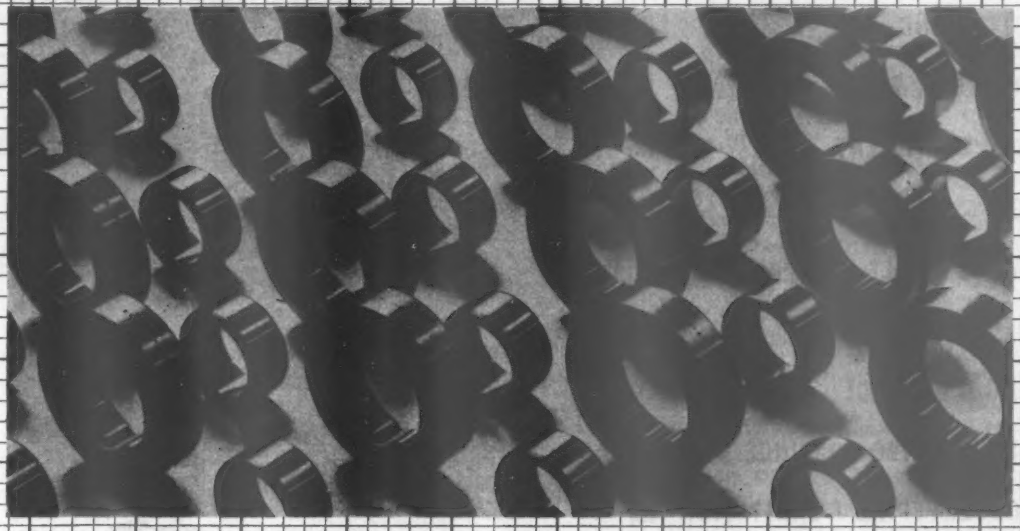
WASHING · If your rope gets dirty, wash and dry it before re-use or storage. You can wash it in a basin of clean water. Or you can hang it in loops over a bar and hose it. Be careful not to drive the dirt in deeper by too much water pressure. Allow the rope to dry, then rap it lightly with a rod, or shake it, to remove remaining dirt.

DRYING · Never store a wet rope before drying it properly. A rope subject to alternate wetting and drying loses strength more quickly than when it is wet all the time. Don't dry wet ropes against radiators, steam pipes, and the like. Excessive heat will dry out the natural moisture in the fiber. The rope becomes lifeless and brittle and loses much of its strength. To dry rope, hang it up or shelve it in a good storage area, as already described.

OTHER CAUTIONS · Don't lubricate your rope. A well-made rope is lubricated adequately for its service life by the manufacturer.

Don't let wet rope freeze. Frozen rope is difficult to handle without damaging the fibers.

For Interchangeable Bearing Parts
HYATT HY-LOADS



FASTER, more convenient, and more economical assembly line operations are possible with Hyatt Hy-Load Roller Bearings because their component parts are freely interchangeable.

Separate bearing elements can be assembled on shafts and in housings at different locations. There is no need to mark or tag matching components because the separate parts can be brought together on the assembly line with complete assurance of their perfect mating. Surely, this feature of Hyatt Hy-Loads makes possible more efficient production planning and layout.

* * *

Interchangeability of component parts is just one advantage of the Hyatt Hy-Load line of cylindrical roller bearings. For complete information write for catalog 547. We'll be glad to send one to you. Hyatt Bearings Division, General Motors Corporation, Harrison, New Jersey.

HYATT ROLLER BEARINGS

WHAT'S NEW IN EQUIPMENT... BRIEFED HERE

AIR CONDITIONING 161

AUXILIARY EQUIPMENT 164

ELECTRICAL EQUIPMENT 175

LIGHTING 182

MAINTENANCE TOOLS & SUPPLIES ..... STARTS HERE

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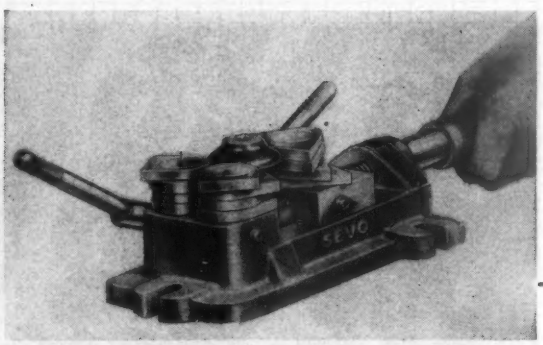
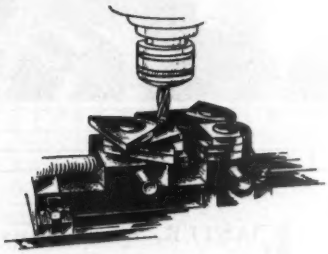
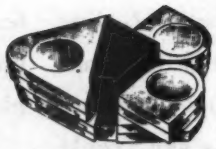


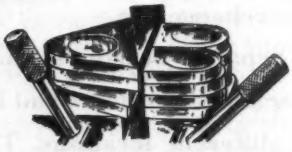
3-JAW VISE is a universal jig for the plant shop.



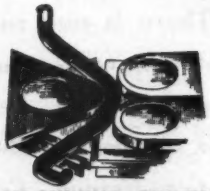
DRILLING ODD SHAPES



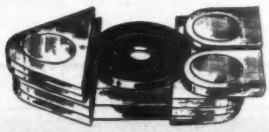
SUPPORTING THE WORK



HOLDING TAPERED PARTS



MACHINING CURVED SHAPES



CLAMPING CIRCULAR FORMS

IN THE NEXT ISSUE

Some notes on important late items. More about them next month.

Automatic Industrial Doors that open or close in 3½ seconds, come packaged ready for quick installation by any maintenance crew.
Clark Door Co., 511 Hunterdon St., Newark, N. J.

Punch-Card Accounting for small shops is a simple, inexpensive operation if you use Boeckeler cards. Cards are coded by punching holes around the margin. You can then quickly fish out the ones you want with a simple selecter needle.
Boeckeler Instrument Co., Tucson, Ariz.

Deflector Attachment for belt and roller conveyors speeds shunting of conveyed material from one line to another.
Wilkie Co., 5520 Arch St., Philadelphia 39.

Polyethylene Valves with no metal parts resist corrosive effects of most common chemicals at temperatures up to 170 degrees F.
American Agile Corp., 5806 Hough Ave., Cleveland.

Drill Table for holding the work piece has built-in coolant pump and reservoir and eight flexible metal coolant nozzles.
Commander Mfg. Co., 4221 W. Kinzie St., Chicago.

Magnetic Amplifier Controller provides precise control of motor speed with few maintenance headaches.
Electric Machinery Mfg. Co., 821 Second Ave., S. E. Minneapolis 14.

Three-Jaw Vise Clamps Odd-Shaped Work Pieces

This Sevo vise could be the answer to a maintenance mechanic's prayer. Its versatility makes it a natural for the many different machining operations that pop up in a maintenance shop from day to day. For with a Sevo universal vise you can quickly clamp almost any odd-shaped part in a convenient working position. There's no need for makeshift shop fixtures; less danger of spoiled work and lost time.

A Swedish concern designed the screw vise to eliminate jigs and set-up time on small job lots.

The vise has three jaws. But each jaw is actually a stack of individual machined-steel plates. Since the jaws have an infinite number of positions, the vise in effect provides the maintenance shop with a universal jig of its own.

De Wilde-Jones, Inc., 181 Steuart St., San Francisco 5.

DRILLING ODD SHAPES is easy with the Sevo clamp. When you turn the main screw, jaws automatically position themselves on the part. A twist of two locking screws and you're ready to drill.

SUPPORTING THE WORK, each jaw plate moves independently of the other plates in the stack. Top plate in each stack just pivots. Bottom plates are slotted, so they can move in and out as well as pivot. Top plate holds the piece; lower plates form a supporting base.

HOLDING TAPERED PARTS for machining, jaws exert holding pressure along full length of the piece. There's no gripping the part at a delicate point. Wedges, taper and dowel pins, and other odd shapes are held securely.

MACHINING CURVED SHAPES takes careful cradling of the part. It's easy to adjust the jaws so clamping pressure is applied where the part is strongest. There's less danger of clamping pressure forcing an expensive work piece out of shape.

CLAMPING CIRCULAR FORMS is tough in 2-point holding jigs. But the extra point of contact in the Sevo clamp keeps parts from twisting.

High-Speed Metal Spray Guns

Two new metallizing guns are said to have the highest spraying speeds yet available in guns designed for hand-held operation. The Metco Type 4E is for machine element work. It will spray any type of metal wire from 20 B&S gage to ⅛ inch at speeds up to 40% faster than previous models.

The Type 5E gun is for corrosion protection coatings. Metco claims it's the first high-speed sprayer of the softer metals, zinc, and aluminum. The 5E sprays 3/16-in. wire, will deposit as much as 55 pounds of zinc per hour.

Both guns have automatic controls that compensate for gas pressure variations and wire kinks. Weight: 4 lb. 12 oz.

Metallizing Engineering Co., Inc., 38-14 30th St., Long Island City 1, N. Y.

Welding Cable Connector

Contact pressure approaching 600 psi. is provided by the Cam-Lok welding cable connector. The Cam-Lok connector is self-compensating for wear. It locks tight, releases easily, and has no spring action, maker says.

The Cam-Lok is made of solid brass, machined to a smooth sliding fit. Low resistance fit is made through a double cam principle. One cam exerts pressure parallel to the axis of the connector, the other perpendicular to the axis.

Available for 1/0 through 3/0 cable, and for No. 2 through 1/0 whip ends. You'll find full details in company bulletin 101, W-15.

Empire Products, Inc., Cam-Lok Div., 817 Main St., Cincinnati.

Pipe Bending Tool

The Tal 6-way Hickey is a simple maintenance tool for forming pipe and conduit on open or slab work. Six "no-slip" bending jaws will make elbows, sets, loops, saddles, etc., in close quarters. A stub-hole jaw permits you to bend conduit protruding from concrete floors or walls. Price: $6.90.

Tal Bender, Inc., 417 N. Water St., Milwaukee 2.

Turn the page

THOMAS
Flexible ALL METAL
COUPLINGS
FOR POWER TRANSMISSION
REQUIRE NO MAINTENANCE

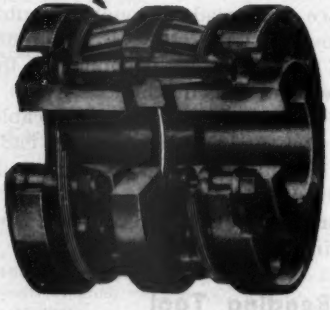
Patented Flexible Disc Rings of special steel transmit the power and provide for misalignment and end float.

Thomas Couplings have a wide range of speeds, horsepower and shaft sizes:
½ to 40,000 HP
1 to 30,000 RPM

Specialists on Couplings for more than 30 years

BACKLASH
FRICTION
WEAR and
CROSS-PULL
are eliminated
Lubrication is not required!

PATENTED FLEXIBLE DISCS



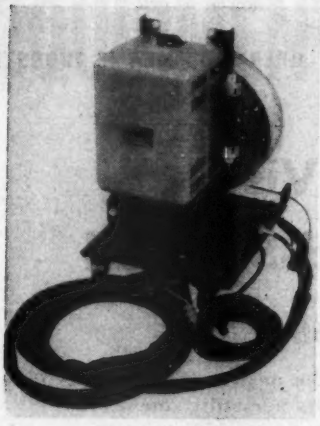
THE THOMAS PRINCIPLE GUARANTEES PERFECT BALANCE UNDER ALL CONDITIONS OF MISALIGNMENT.

NO MAINTENANCE PROBLEMS.

ALL PARTS ARE SOLIDLY BOLTED TOGETHER.

Write for the latest reprint of our Engineering Catalog.

THOMAS FLEXIBLE COUPLING CO.
WARREN, PENNSYLVANIA



Automatic Wire-Feed for Arc Welders

A Fillerweld attachment can speed alloy-metal welding on jobs where filler metal must be used. Fillerweld gives the operator a continuous flow of filler metal that he can control through a finger switch. It's designed to work with gas-shielded arc welders.

With Fillerweld, the operator can start or stop the flow of metal without breaking the arc. This means a smoother, faster weld. Since the Fillerweld is easy to use, operators can be trained to use the equipment in a short time.

The welder first pre-sets his feed speed, then strikes his arc. When a molten pool forms, he pulls his gun trigger, and the wire begins to feed automatically. The operator releases the trigger to stop at any time.

The process works to best advantage on stock under 3/16 inch thick. But if speed is not important, G-E engineers say that it will produce a high-quality weld on thicker material.

Fillerweld has two main elements—the welding gun, and a mechanical feed unit. Rated at 250 amperes, the gun will take tungsten wire from 0.040 to 5/32 inch in diameter, up to 7 inches long.

General Electric Co., Schenectady 5, N. Y.

Oven Protects Thirsty Electrodes

Mineral-coated welding electrodes are thirsty by nature. They readily absorb moisture from the air. The effect of this excess moisture on low hydrogen rods often is poor welding performance, excess scrap.

The Roden DryRod oven is one way to prevent moisture from killing your low-hydrogen electrodes. The unit is designed to protect the electrodes from the time you take them out of their factory-sealed container until you actually use them.

This new DryRod oven is a portable heated storage unit. It provides automatic control of moisture content (to within 0.2%) and temperature of the electrodes at their point of use. Unit is heated by an 840-watt element that operates on 110 or 220 volts. Capacity is 350 pounds of electrodes up to 18 inches in length.

Philip Roden Co., 1721 E. Lake Bluff Blvd., Milwaukee.

•

ANOTHER MOISTURE-STABILIZER for low-hydrogen electrodes is the Blueweld unit made by Fred C. Archer, Inc., 606 West Wisconsin Ave., Milwaukee 3. This dehumidifying compartment stores up to 400 pounds of mineral-coated electrodes right at the job.

Turn the page

Keep your eye on V·P·I WHEN SELECTING BLOWERS

CENTRIFUGAL

Motor-driven Type OIB Centrifugal Blower in chemical processing plant. Capacity 19,000 cfm.

Wet bark is blown 400 feet, from charger to stoker, by R-C Rotary Positive Blower in this Nova Scotia paper mill.

ROTARY

You can't afford to risk shutdowns today because of unsatisfactory or inadequate equipment performance. To keep production moving at the required fast pace, calls for blowers or gas pumps that continuously deliver positive Volume at required Pressure—and at low power costs to reduce operating expense.

You get these 3 essentials from R-C Blowers and Gas Pumps. Whether your needs call for Centrifugal or Rotary Positive units, we can match them from our exclusive *dual-ability line.* With capacities from 5 cfm to 100,000 cfm, you can usually find R-C units that closely fit your demands, with resultant savings in time, cost, space, weight and power.

From an experience of almost a century of blower building, our engineers will gladly make suggestions of the right R-C equipment to move or measure gas and air to keep production going.

ROOTS-CONNERSVILLE BLOWER CORPORATION, 510 Central Avenue, Connersville, Indiana.

ROOTS-CONNERSVILLE

BLOWER BUILDERS SINCE 1854

ONE OF THE DRESSER INDUSTRIES

3M Belts cut costs Because They Last Longer

King Foundry, Minneapolis, reports 3M Abrasive Belts last 6 times longer than ordinary belts, resist loading on aluminum and brass castings.

No more production slow-downs for frequent belt-changing at King Foundry, Minneapolis! A 3M Methods Engineer recommended the *right* 3M Abrasive Belts for their job. Now operators report less loading—faster, smoother cutting, and belts are lasting 12 hours instead of 2 hours with previous abrasives. Production's up to 300 cast-aluminum housings per belt!

Cutting grinding and finishing costs is part of the day's job for the 3M Methods Engineer. And he's ready to go to work for you—at no cost, no obligation.

Use the coupon below for immediate attention. A copy of the booklet "Step Up Production" will show you how others have cut costs, increased production. Write today!

Minnesota Mining & Mfg. Co.,
Dept. FM-111, St. Paul 6, Minn.

☐ Please have a 3M Methods Engineer call.

☐ Send a copy of "Step up Production."

Name.....

Company.....

Address.....

City..... Zone..... State.....

Made in U.S.A. by MINNESOTA MINING & MFG. CO., St. Paul 6, Minn.—also makers of "Scotch" Brand Pressure-sensitive Tapes, "Scotch" Sound Recording Tape, "Underseal" Rubberized Coating, "Scotchlite" Reflective Sheeting, "Safety-Walk" Non-slip Surfacing, "3M" Adhesives. General Export: Minnesota Mining & Mfg. Co., International Division, 270 Park Avenue, New York 17, N. Y.

In Canada: Minnesota Mining & Mfg. of Canada, Ltd., London, Canada.

NEW MAINTENANCE TOOLS & SUPPLIES

Begins on page 154

Bench-Type Parts Cleaner

With Brush Flush, each shop mechanic can have his own parts cleaning unit. This kit includes hollow handle brush and hose, solvent pump, and a separate dip basket soak tank.

The pump provides a steady flow of clean solvent at the end of the brush bristles. Oil, dirt, and grease are flushed away as they are loosened with the brush. Circulating solvent is filtered twice. Once on the large screen work platform, and once again by a baffle screen at the pump intake. Pump runs on 115 volts.

Prior to cleaning you can soak parts in the 2½-gal. soak tank—using either the same solvent as in the main tank, or a different solution.

Graymills Corp., 1960 Ridge Ave., Evanston, Ill.

Metal Cutting Band Saw

A new heavy-duty band saw will take 12-in. rounds, and flat stock up to 12x20 inches. It is designed for dry cutting on intermittent operation; or, with the addition of coolant equipment, for cutting continuously at high speed.

Turn the page

Grinding Problem?

Black & Decker Bench and Portable Grinders speed up a wide range of jobs!

Quality-built models to suit your needs, give long service!

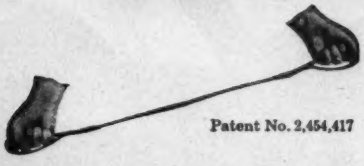
BLACK & DECKER Grinders do *more* jobs because of their surprising versatility and "tailored-power" B&D motors—do them *better* because of their real quality construction! B&D Bench Grinders give you dependable, B&D-built constant-speed motors; streamlined design for more work clearance; adjustable U-shaped tool rests for better support; strong steel wheel guards for extra safety. B&D Portable Grinders give you perfect balance for easier handling; splined gear mountings for perfect power transmission; steel bearing inserts for smooth running; complete abrasive dust protection for vital parts; extra-safe welded steel wheel guards.

Whatever your problem, see your nearby B&D Distributor *first* for expert help—and for eye-opening demonstrations of timesaving, cost-cutting B&D Tools! Write for free catalog to: THE BLACK & DECKER MFG. CO., 623 Pennsylvania Ave., Towson 4, Maryland.

LEADING DISTRIBUTORS EVERYWHERE SELL

B&D Black & Decker PORTABLE ELECTRIC TOOLS

MAKE THIS TEST YOURSELF...WITH A FREE Tuffy SLING



Patent No. 2,454,417

Tie a knot in a Tuffy Sling, then pull it tight with both hands and feet. See how flexible it is — and how it straightens out without damage. The secret is in the braided fabric construction — a patented Tuffy feature!

Scores of wires are stranded into 9 parts, then machine woven into an interlaced wire fabric entirely unlike conventional wire rope slings. Even cutting one of the 9 parts does not result in stranding. And eye splices develop up to 95% of the fabric strength.

11 Types of Tuffy Slings If none of the 11 factory packaged Tuffy Sling types exactly meet your needs, Union Wire Rope engineers will develop one that does. Tuffy Slings are proof-tested to twice safe working load. The safe working load is stamped on a metal band attached to each sling. If you have your own rigging loft, Tuffy braided fabric is available by the reel.

MAIL COUPON TODAY FOR YOUR FREE SLING
This special 3-foot sample is yours without cost so that you can prove to yourself the advantages of a Tuffy Sling. Just mail the coupon.

UNION WIRE ROPE CORPORATION
Specialists in Wire Rope, Braided Wire Fabric and High Carbon Wire
2234 Manchester Ave. Kansas City, Mo.

Gentlemen: Please have my Union Wire Rope Fieldman deliver my free Tuffy sling sample.

NAME_____

FIRM NAME _____

ADDRESS_____

CITY_____ ZONE____ STATE_____

to an accuracy of a few thousandths of an inch, with no burr and minimum kerf. The machine has four cutting speeds—61, 108, 165, and 259 fpm. A 4-step pulley on motor and drive shaft provides the variations.

The unit weighs 1100 pounds (equipped with coolant device). But you can set it up on casters for portable operation. All wheels and moving parts are safely enclosed. But you get an unobstructed view of the cutting action. Power is automatically switched off at the end of the cut.

Kalamazoo Tank & Silo Co., Harrison St., Kalamazoo 16, Mich.

Manual Saw Set

The maker claims fast, easy action for his Model 42 saw set. You can quickly adjust it to give more or less set to teeth on back, panel hand, and circular saws. It will handle saws 18 gage or thinner, with from 4 to 16 points to the inch.

Anvil adjustment wheel permits uniformity of fine settings. Calibrations indicate average settings for saws with different numbers of points per inch. Self-locking saw stop compensates for variation in saw-blade thickness.

Stanley Tools, 111 Elm Ave., New Britain, Conn.

•

CONSTANT FURNACE ATMOSPHERES are tough to maintain, if you've got a dirty fuel oil system. Sludge and gum plug up feed lines and strainers, cause variations in fuel flow to the burners. But not so with Petisol A-111, a fuel oil treating compound. Petroleum Solvents Corp., 331 Madison Ave., New York 17, says that an initial treatment with Petisol will clean out all residual deposits in your system, and make it easy for future preventive maintenance to keep fuel lines clean.

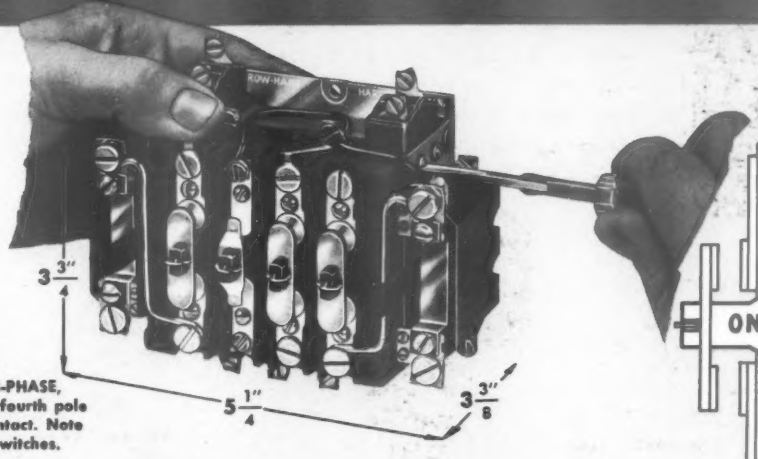
Turn to page 161

GREATER ELECTRICAL AVAILABILITY YOURS WITH TYPE "RA" RIGHT ANGLE ADVANCED DESIGN MOTOR CONTROLS

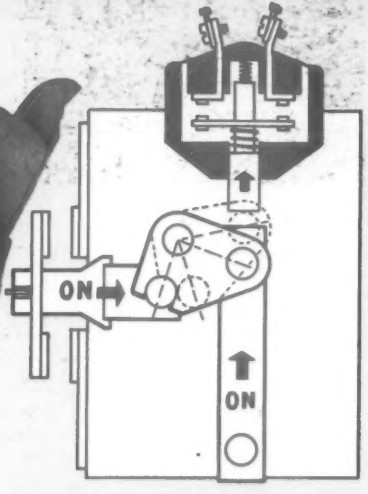
ARROW AH HART

- JUST ½ THE SIZE • ½ THE WEIGHT
- BETTER PERFORMANCE
- 55% GREATER ARC RESISTANCE
- 30% SAVINGS IN INSTALLATION
- EASY TO WIRE AND TO INSPECT
- AVAILABLE IN SIZES 0, 1, 2, 3 and 4 IN NEMA Enclosure Types 1, IV, V, VII, IX

PLUS EXCLUSIVE ELECTRICAL INTERLOCK



SIZE 1, REMOTE CONTROL, Standard 3-PHASE, employing fourth pole holding contact. Note auxiliary switches.



Schematic pictures "RA" mechanism trip arm that automatically energizes interlock switch.

NO OTHER STARTER PROVIDES THIS VERSATILITY

Arrow-Hart's "RA", right angle, balanced mechanism with bellcrank fulcrum assures simple and positive force to operate the A-H auxiliary switch or switches. JUST TWO SCREWS and a completely enclosed electrical holding interlock switch provide dependable operation of numerous interlocking device combinations or signal lights. Men confronted with adding more circuits to serve more needs in restricted space have accepted and are benefiting from the many outstanding features of the A-H Type "RA" line of motor controls. Buy an Arrow-Hart starter today and see for yourself.

BUY WITH CONFIDENCE PROFIT BY PERFORMANCE

THE ARROW-HART & HEGEMAN ELECTRIC CO., HARTFORD, CONN., U. S. A.

ELECTRICAL CONTROLS

ARROW AH HART

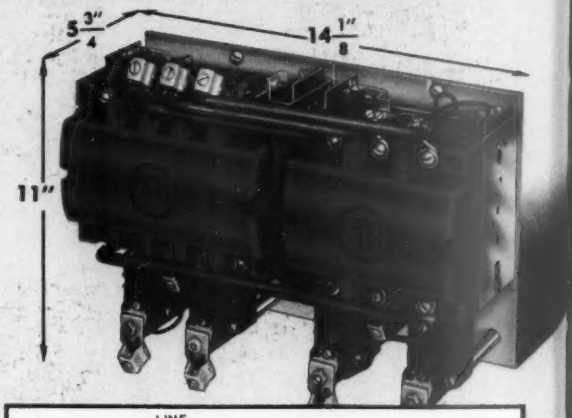
ESTABLISHED IN 1890

GREATER SAVINGS IN SPACE IN TIME IN DOLLARS

WITH ARROW AH HART TYPE "RA" MAGNETIC STARTERS

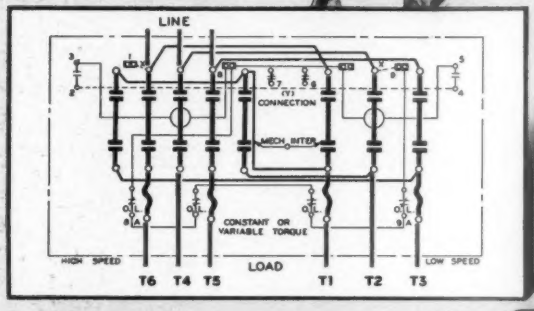
AVAILABLE WITH EXCLUSIVE AUXILIARY SWITCHES

The Arrow-Hart motor control line is out front with an advanced design to provide industry with greater performance in smaller space. Adaptability is found in permitting the interlocking of numerous devices by means of a rugged and compact auxiliary switch. Another A-H exclusive, this utility switch is inserted from the top and requires but two screws for effective operation. The auxiliary is operated through contact with the operating lever arm of the "RA" mechanism. All auxiliary switches mount easily and quickly in one position.



THREE BASIC TYPES

Available in standard with BLACK button (one normally open), with RED button (one normally closed), and with GREEN button (one normally open and one normally closed). All auxiliary interlock switches are properly identified to aid in selection and safe application. One BLACK button (normally open) switch is furnished as standard on most motor starters.



TYPICAL INSTALLATION

Pictured to the right is a typical application of A-H auxiliary switches used in conjunction with an Arrow-Hart Size 3, 3-phase, 2-speed reconnected winding type of control. Note easy access to terminals and the big advantages of straight-thru front wiring. Additional information appears on the preceding page.

"RA" LINE A COMPLETE LINE

The patented "RA" design is available in magnetic starters and contactors in Sizes 0, 1, 2, 3 and 4 as units for panel installation or in NEMA enclosure types I, IV, V, VII and IX. The Explo-Safe line of explosion-proof housings features a Feraloy casting of new design at greatly reduced weight and bulk. There are "RA" controls to serve you best.

ARROW-HART

INDUSTRIAL CONTROL DIVISION

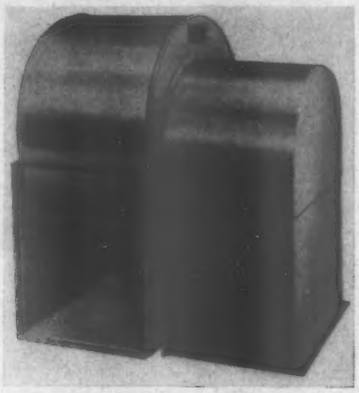
THE ARROW-HART & HEGEMAN ELECTRIC CO., 103 HAWTHORN ST., HARTFORD 6, CONN., U.S.A.

Branches in: BOSTON, CHICAGO, CLEVELAND, CINCINNATI, DALLAS, DENVER, DETROIT, LOS ANGELES, NEW YORK, PHILADELPHIA, PITTSBURGH, SAN FRANCISCO, SYRACUSE. In Canada: ARROW-HART & HEGEMAN (CANADA) LTD., MT. DENNIS, TORONTO

WHAT'S NEW IN EQUIPMENT

Begins on page 154

AIR CONDITIONING



Centrifugal Fan in Weatherproof Hood

No additional protective enclosure is needed for outdoor installation of this centrifugal fan unit. A weatherproof hood (part of the unit) fully protects the motor drive section.

This Trane Arrangement No. 10 comes with either backwardly inclined or forwardly curved blades. They are single-width, single-inlet models, with Class I construction. You can get wheel diameters as large as 60 inches. Fans have efficiency, noise, and horsepower characteristics of the standard company line. Units have V-belt drive.

The Trane Co., LaCrosse, Wis.

•

INDOOR-OUTDOOR HEATING CONTROL anticipates heating needs of building by responding to changes in outdoor weather. Weather-Flo, made by Automatic Devices Co., Inc., Western Springs, Ill., is said to eliminate over-shooting and under-heating. You can adjust it to the design temperatures of different types of heating systems.

Turn the page

if you want to increase labor productivity..

. . . you'll need **good lighting**. But there's "more" to good lighting than meets the eye, and that essential "more" is provided by Smithcraft's features of design and manufacture. These features assure ease of installation, ease of maintenance, and long-term trouble-free service, as well as unexcelled lighting performance.

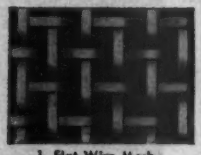
THOUSANDS OF SMITHCRAFT INDUSTRIAL FIXTURES ARE INSTALLED IN THE OAK RIDGE ATOMIC ENERGY PROJECT

It really doesn't matter what the application may be . . . there's a Smithcraft fluorescent fixture for virtually any industrial location. The Oak Ridge Atomic Energy Project is only one of the tremendous number of diversified industries that utilize "lighting by Smithcraft". Textile mills, machine shops, industrial plants of every description . . . throughout the nation, Smithcraft fixtures provide the "better-than-adequate" lighting that's so effective in increasing labor productivity.

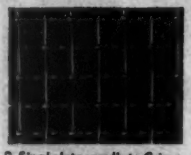
We've compiled the descriptive folders and specification sheets on every Smithcraft fluorescent fixture in a bound catalog that's yours for the asking. Write for your copy today. You'll see why "America's Finest Fluorescent Fixtures" are products of "Smithcraft".

Smithcraft LIGHTING DIVISION CHELSEA 50, MASS.
AMERICA'S FINEST FLUORESCENT FIXTURES

9 REASONS for specifying *Cambridge* Industrial Wire Cloth



1. Flat Wire Mesh



2. Single Intermediate Crimp

3. Double Intermediate Crimp

4. Double Crimped

5. Twilled Weave

6. Calendered Backing Screen

7. Oblong Mesh

8. Plain Dutch Filter Cloth

9. Twilled Dutch Filter Cloth

● **SELECT THE WIRE CLOTH** that meets your requirements best from these 9 basic Cambridge weaves. Each is available to you in any metal or alloy wire of any gauge. Mesh sizes range from 4" openings to 20 x 250 mesh, according to your needs. *Many types of Cambridge wire cloth are ready for immediate shipment.*

Close attention to each loom by individual operators during weaving is your assurance of exact mesh count. Each finished piece is carefully inspected before shipment to make certain it is free from defects.

TELL US your special problem in filtration, screening or sizing. Perhaps our facilities and experience can be combined to produce the special type of wire cloth needed.

FREE WIRE CLOTH HANDBOOK! 73 pages of specifications, metallurgical data and descriptions of industrial wire cloth. WRITE TODAY for your copy of this valuable reference book.

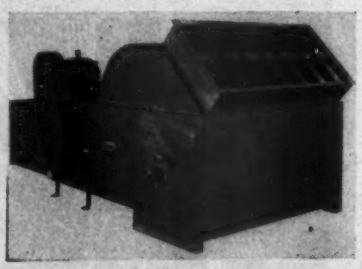
The Cambridge Wire Cloth Co.
Dept. E • Cambridge 11, Md.

WIRE CLOTH | METAL CONVEYOR BELTS | SPECIAL METAL FABRICATIONS

OFFICES IN PRINCIPAL INDUSTRIAL CITIES
See "Wire Cloth" in your Classified Telephone Directory.

AIR CONDITIONING EQUIPMENT

Begins on page 161



Zoned Air Conditioning From a Central System

A single unit, Carrier's Weathermaker, gives you independent control of air conditioning in separate areas of your plant building. Units come in five sizes, ranging from 12 to 58 tons capacity. The factory-built damper section permits you to zone as many as 14 different sections in the plant.

Carrier claims its zoning system will be specially useful in plants where cooling or heating loads vary in different areas due to the changing position of the sun. Zoning will also compensate for the starting and stopping of heat-producing equipment.

The new Weathermakers are of the horizontal blow-through type. Damper control for separate zones is provided through a double outlet arrangement. One outlet supplies cooled, dehumidified air, the other supplies warm air. These twin outlets are divided in turn into separate dampering compartments for each zone.

Carrier Corp., 300 S. Geddes St., Syracuse, N. Y.

•

OIL MIST FROM CUTTING OPERATIONS can be recovered with a Trion precipitator. The precipitator can remove a health hazard, also save you up to five gallons of oil a day. Unit works on principle of electrostatic attraction. Trion Inc., 1000 Island Ave., McKees Rocks, Pa.

Turn the page

5 HEAT TREAT PROCESSES + HIGH PRODUCTION in 1 ALLCASE Furnace

5 processes can be carried out in the 'Surface' ALLCASE Furnace: case carburizing, dry cyaniding, clean hardening, homogeneous carburizing, carbon restoration.

● Commercial heat treat shops and manufacturers' heat treat departments can operate with *diverse processes* and *high production* in a 'Surface' batch-type ALLCASE furnace.

HIGH HEATING RATES: Up to 200 lbs. per hr. of work per sq. ft. of hearth area. Gross furnace charges up to 1600 lbs. can be processed. HEATING: ALLCASE furnace features radiant tube heating with inherent advantages of forced convection. LESS LABOR: Actual labor required in furnace operation is roughly ½ the time of 1 man. ECONOMY OF OPERATION: For maximum capacity loads while dry cyaniding (to case depths of .007-.010-in.) between 1.2-1.5 cu. ft. of 1000 Btu gas are consumed per pound of work treated.

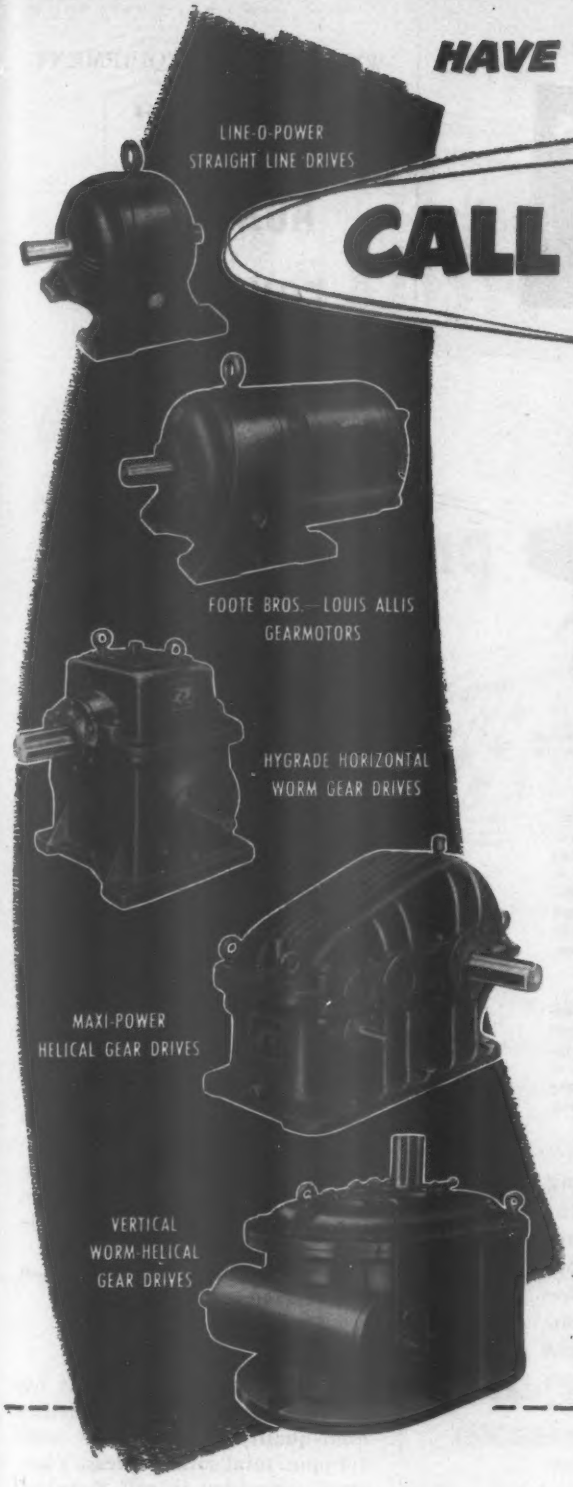
Write today for reprint 50-E giving full information on the 'Surface' ALLCASE Furnace.

'Surface'
Industrial Furnaces

Surface Combustion Corporation
Toledo 1, Ohio

HAVE YOU A DRIVE PROBLEM?

CALL FOOTE BROS.



Compact, small size units for use on original equipment—husky horizontal or vertical worm gear drives—heavy duty helical gear drives up to approximately 1000 h. p.—gearmotors. Whatever your requirements in power transmission, you will find exactly what you need in the complete Foote Bros. line.

Three large plants, containing the latest in gear cutting equipment, are backed by nearly a century of engineering and manufacturing experience. New techniques, better control of material, improved manufacturing methods—all assure superior enclosed gear drives. Check the coupon for the bulletins in which you are interested.

FOOTE BROS. GEAR AND MACHINE CORPORATION
Dept. I, 4545 S. Western Ave. • Chicago 9, Illinois

LINE-O-POWER STRAIGHT-LINE DRIVES
Economical in original cost and operation. Duti-Rated Gears have file-hard tooth surfaces and ductile cores, assuring long life. Double or triple reductions, with ratios from 5 to 1 up to 238 to 1 and capacity range from 1 up to 200 horsepower.

FOOTE BROS.—LOUIS ALLIS GEARMOTORS
A compact line of gearmotors in 17 sizes in single, double and triple reductions, incorporating Duti-Rated Gears that assure long wear life and maximum load-carrying capacity. Available with Louis Allis open drip-proof, splash-proof, enclosed and explosion-proof motors.

HYGRADE WORM GEAR DRIVES
Heavy duty drives with precision worm gearing that assures high efficiency and load-carrying capacity. Horizontal, vertical and Hytop (extended shaft) types. Ratios from 4⅛ to 1 up to 4,108 to 1. Capacity up to 260 horsepower.

MAXI-POWER HELICAL GEAR DRIVES
Heavy-duty helical gear drives. Available in single reduction units, ratios up to 9.91 to 1; capacities up to 1,550 horsepower; double-reduction units, ratios from 9.32 up to 71 to 1, capacities to 1100 horsepower; triple reduction units, ratios from 79 up to 360 to 1, capacities up to 420 horsepower.

WORM-HELICAL GEAR DRIVES
Heavy duty vertical drives with horizontal input shafts and vertical output shafts—up or down. Ratios from approximately 25 to 285 to 1 and a capacity range up to 128 horsepower.

Foote Bros. Gear and Machine Corporation
Dept. I, 4545 South Western Boulevard
Chicago 9, Illinois

- ☐ Bulletin HGA Hygrade Worm Gear Drives
- ☐ Bulletin LPB Line-O-Power Straight Line Drives
- ☐ Bulletin MPB Maxi-Power Helical Gear Drives
- ☐ Bulletin GMA Foote Bros.-Louis Allis Gearmotors
- ☐ Bulletin WHA Worm-Helical Gear Drives

Name.....*Position*.....
Company.....
Address.....
City.....*Zone*.....*State*.....

FOOTE BROS.
Better Power Transmission Through Better Gears

You Can See the

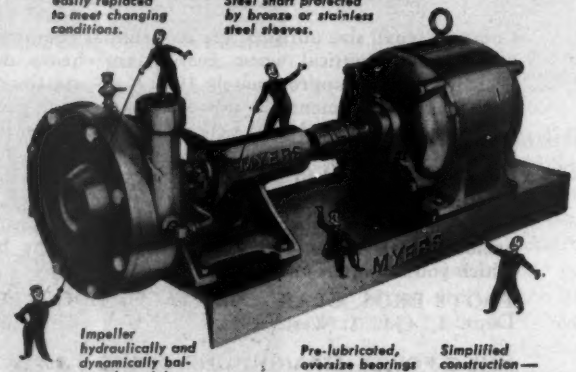
extra value in

NEW MYERS centrifugal pumps!

New Myers Direct-Connected Centrifugals: Available with or without motor. Sizes, ½ H.P. to 10 H.P.

Casing and impeller easily replaced to meet changing conditions.

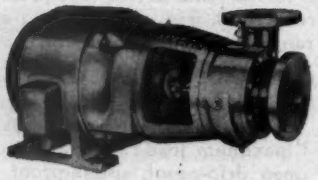
Steel shaft protected by bronze or stainless steel sleeves.



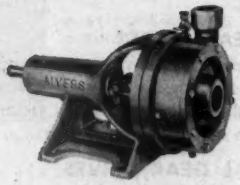
Impeller hydraulically and dynamically balanced—minimizes thrust.

Pre-lubricated, oversize bearings—extra durable.

Simplified construction—requires minimum installation space.



New Myers Motor-Mounted Centrifugals: Extra-compact. Exceptionally rugged. Sizes 1 H.P. to 20 H.P. Available in three material combinations—standard fitted, all-bronze and all-iron.



New Myers Belt-Driven Centrifugals: V-belt or flat-belt drive. Oversize shaft is removable from either end of pump. Types to handle many different liquids at temperatures to 220° F.

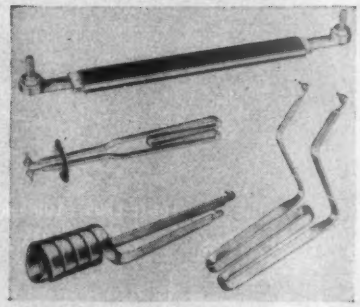
Steady volume . . . outstanding operating economy . . . smooth, trouble-free performance—you get them *all* in these new Myers Centrifugal Pumps. Line includes models that are ideal for general industrial applications—including drainage, booster service, air conditioning, etc.—also adaptable for irrigation and many other agricultural uses. All Myers Centrifugals are easily serviced. Capacities to 650 gpm. Write Dept. 7008-L1 for complete catalog and name of your distributor.

THE F. E. MYERS & BRO. CO.

Dept. 7008-L1 Ashland, Ohio

Begins on page 154

AUXILIARY EQUIPMENT



Heating Elements You Can Twist to Suit the Job

This electric heating element has both the flat surface needed for contact heating, and the thin cross section needed for efficient heating by convection or air flow. You can wrap it around kettles, tanks, and ovens. Or suspend it in the liquid to be heated.

Maker says it is a rugged unit that can be readily bent and formed into many shapes. The flat heater strips come in lengths up to 10 feet, in widths of 17/32 and 33/32 inch. Thickness is only 5/32 inch.

Outer sheath prevents arcing or sparking. You can get it with any one of a variety of terminals, brackets, or straps.

Syntron Corp., 480 Lexington Ave., Homer City, Pa.

•

A DRY SCRUBBER PURIFIER that fits inside your steam drum provides high-quality steam vapor with 1.0 ppm. total solids or less. Two-stage separator is self-cleaning, has practically no pressure loss, says maker, The Centrix Corp., 3608 Payne Ave., Cleveland 14. There are no filter elements, no moving parts.

Turn the page

● To merit the shield that identifies CERTIFIED STARTERS, starters are subjected to severe tests by Electrical Testing Laboratories, Inc.

Among the many tests to make certain the starters meet the precise specifications, are those that assure the user he will get positive starting and at least 36,000 operations from a CERTIFIED STARTER.

if you want **MAXIMUM LAMP LIFE**
REDUCED MAINTENANCE COSTS
INCREASED FLUORESCENT LIGHTING SATISFACTION

insist on CERTIFIED STARTERS for every installation — new or old.

Certified Fluorescent Starter Manufacturers

2116 KEITH BUILDING • CLEVELAND 15, OHIO

Low-Cost Heating

FOR NEW BUILDINGS
OR PLANT EXPANSION

Type 150 Suspended Unit Heater — propeller fan type; 60,000 to 150,000 Btu capacities; shipped assembled and pre-wired. AGA and UL approved.

Mueller Climatrol

GAS-FIRED UNIT HEATERS

— save costs, save space

For a compact, efficient heating system where time and costs are vital factors — the Mueller Climatrol unit heater line supplies the perfect answer!

- ✓ *Installation Cost is Low* — shipped pre-wired, completely assembled . . . just hang, connect to gas and power lines, and vent. No special chimney needed.
- ✓ *Operating Cost is Low* — efficient horizontal design assures maximum heat extraction, minimum fuel costs.
- ✓ *Maintenance is Easy*—can be completely cleaned and serviced from below without lowering the unit.

When you think of space-heating think of Mueller Climatrol. Capacities to fit any requirement.

Capacities and Types for Every Job

Blower Type 151 — Four sizes: 60,000 to 150,000 Btu input; all welded, horizontal design; AGA and UL approved. Shipped assembled and pre-wired.

Floor Type UH — nine sizes: from 150,000 to 540,000 Btu input in 45,000 increments; AGA approved. Easy to assemble and install.

94th Anniversary

Mueller Climatrol

TEAR OUT THIS COUPON AND MAIL TODAY!

L. J. Mueller Furnace Co.
2042M W. Oklahoma Ave., Milwaukee 15, Wisconsin

Please rush me complete information on space-saving and cost-saving Mueller Climatrol unit heaters.

Name.....
Position.....
Company.....
Company Address.....
City.....(.....) State.....

8-56A

NEW AUXILIARY EQUIPMENT

Begins on page 164

Condensing Filter for Compressed Air Lines

Because of its extra size and extended surface, the Airlenco compressed air filter doubles as a condenser, too. It's a new approach, says the maker, to the problem of getting water and oil out of your compressed air supply.

The filter has a steel outer shell 6 inches in diameter, 36 inches long, and a steel inner cartridge 5 inches in diameter, 24 inches long. This cartridge is loosely packed with Fiberglas.

Most of the moisture in the air condenses as the incoming air expands in the space between the inner and outer shells. The air then passes through the Fiberglas cartridge, which baffles out any remaining moisture and oil. Filter requires no servicing other than frequent draining.

Air-Line Engineering Co., 4758 Warner Rd., Cleveland.

Compressed Air Drier and Filter

The Vi-Speed filter performs a threefold function in compressed air systems. You can use it (1) to remove moisture, oil, dirt and scale from air and gases, (2) to reduce humidity below the condensation point, and (3) as a storage tank.

You can use Vi-Speed wherever dry, clean air is needed—for air tools, for drying operations, for liquid agitation or displacement. It has simple, rugged construction, with no moving parts, no orifices to clog.

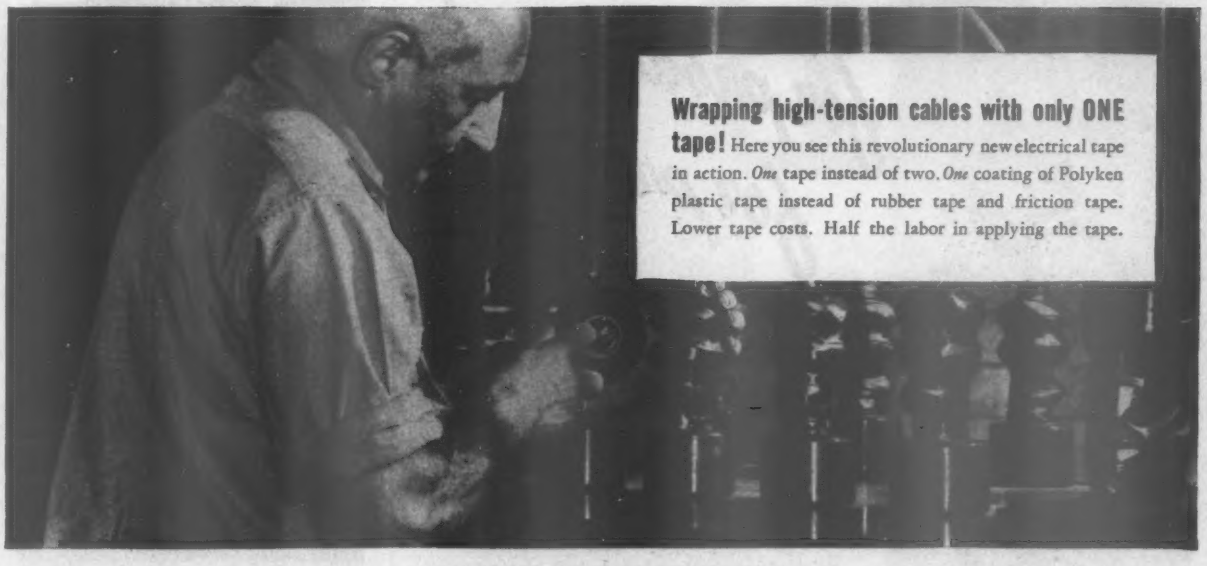
Unit is self-cleaning, self-regulating, and fully automatic. You just have to add a small amount of filter material about once a month. Model 25 delivers 25 cfm., Model 200 delivers 200 cfm. —both at 100 psi.

Van Products Co., 3734 W. 12th St., Erie, Pa.

Turn the page

THE NEW Polyken® INDUSTRIAL TAPES

TAILORED TO YOUR JOB



Wrapping high-tension cables with only ONE tape! Here you see this revolutionary new electrical tape in action. *One* tape instead of two. *One* coating of Polyken plastic tape instead of rubber tape and friction tape. Lower tape costs. Half the labor in applying the tape.

Costs CUT IN HALF with new tape

Splice with one tape instead of two

Until Polyken No. 822 was developed, wrapping high-tension cables was a two-step job. First, a rubber splicing compound, followed by an outer wrap of friction tape.

Now you can forget the rubber compound! Polyken Electrical Tape No. 822 is only 9 mils thick—but it's 10,000 volts strong (dielectric strength). Makes *one* quick operation out of two tedious ones—and provides better protection.

No. 822 is the only oriented polyethylene tape with a successful pressure-sensitive adhesive. Stretches both ways, so that it covers rough and irregular surfaces. High moisture resistance. Solvent proof. Corrosion proof. For splicing, wrapping, insulating, corrosion coating of cables, wires, controls, pipes, conduits, and hundreds of other uses. Write for free samples today!

Polyken, Dept. FML
Chicago 6, Ill.

For specifications, samples, and further information on this and other Polyken tapes, please send me your *FREE BOOKLET*, "Tape is a Tool."

Name_____ Title_____

Company_____

Street Address_____

City_____ Zone____ State_____

Polyken **Industrial Tape, Department of Bauer & Black, Division of The Kendall Company**

PEORIA CHAIN

for production!
for profit!

H Class Drive Chain

H Class Roller Chain

Roller Top Transfer Chain

Detachable Chain

Roller Top Transfer Chain

Production is the key to profit — and both benefit with dependable PEORIA CHAIN. The same iron that goes into these rugged links produces castings that meet the rigid specifications of leading U.S. manufacturers. The latest scientific testing and inspection equipment and procedure controls the uniform high quality of Peoria Chain and attachments. Get full information on the complete line from your regular industrial distributor.

PEORIA MALLEABLE CASTINGS CO.
FT. OF ALEXANDER ST., PEORIA, ILLINOIS
CHAIN MAKERS FOR OVER YEARS

NEW AUXILIARY EQUIPMENT

Begins on page 164

Air Hose Reel for Hand Tools

With this combination reel you can suspend an air-powered hand tool on its own air supply line. There's no need for special cable suspension with a separate air line hose.

You can install this packaged unit over workbenches on assembly lines. The tool is counterbalanced by the spring-tension in the hose reel. When the worker releases the tool, it automatically rises to a pre-set position over the work spot.

Universal mounting brackets permit mounting on post, wall, or hanging cable. A rubber bumper controls length of travel when tool is released. You get 15 feet of ¼-in. I.D. hose with male fitting.

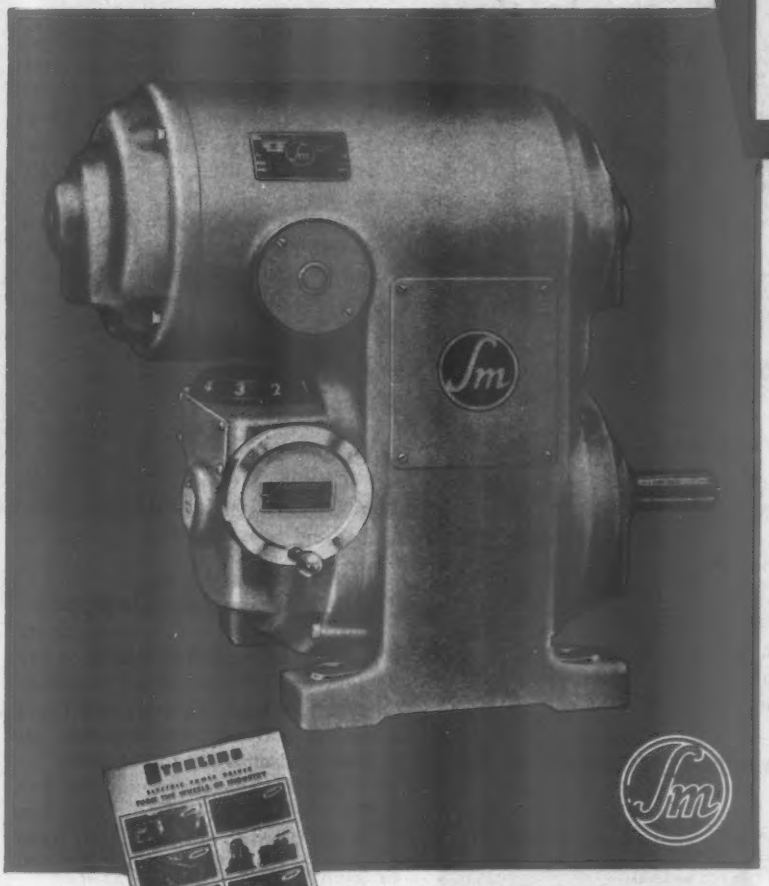
Wayne Pump Co., Tecumseh, Fort Wayne 4, Ind.

Turn the page

power modernization

Even a brand new motor may be obsolete...

if you do not have control of speed



Ask for your copy of— pictorial bulletin No. A-58, showing Sterling Electric Power Drives Turning The Wheels of Industry.

A leading plywood machinery manufacturer* states,

"When a large plywood mill installed a Sterling Speed-Trol on our skinner saw, they obtained:

- **35% increase in production**
- **Savings that paid for the Speed-Trol installation in one month."**

(*Name upon request)

STERLING SPEED-TROL

...GIVES YOU VARIABLE SPEED CONTROL NECESSARY FOR:

PROCESS CONTROL OF: Temperature—viscosity—level—pressure—flow—etc.

TIME CONTROL OF: Baking—drying—heating—cooking—pasteurizing—soaking—chemical action—etc.

EQUIPMENT ADAPTATION TO: Load variation—sequence synchronization. Size—tension—hardness or shape of materials to be processed—machined—conveyed—blended—mixed—etc.

VARIATIONS IN: Quality—quantity—operators' abilities—etc.

STERLING ELECTRIC MOTORS

Plants: New York 51, N.Y.; Los Angeles 22, California; Hamilton, Canada; Santiago, Chile.

Offices and distributors in all principal cities.

OUT OUR WAY
LOOK OUT! YOU YOUNG GUYS MAKE ME NERVOUS, GETTIN' SO CLOSE TO EXPOSED GEARS LIKE THAT!
HE LIKES TO RAZZ TH' YOUNG GENERATION ABOUT THEM HAVING TO PUT COVERS AN' SAFETY DEVICES ON EVERYTHING TO KEEP TH' BABES OUT OF DANGER!
BUT HE KNOWS TH' VALUE OF SAFETY! DIDN'T HE SEND FOR TH' SAMPLE OF SOL-SPEEDI-DRI?
SAFETY CONSCIOUS
J.R.WILLIAMS

First in sales—
because it's first in value

SOL·SPEEDI·DRI

Laboratory tests of many top companies—of independent experts—of our own—all prove that SOL-SPEEDI-DRI is first in value. No wonder, then, that it's America's largest selling oil and grease absorbent! Selected raw materials, careful processing, and laboratory controls keep SOL-SPEEDI-DRI quality always uniform. Send the coupon today for a free sample and brochure about how to keep *your* floors clean and slip-proof with SOL-SPEEDI-DRI.

SPEEDI-DRI CORP., 210 W. Washington Sq., Philadelphia 5, Pa.

Warehouse stocks maintained in principal cities of the United States and Canada.

• • •

Inquirers in New York, New England, and New Jersey should write to Speedi-Dri Corp. Elsewhere in U.S. to Waverly Petroleum Products Co., 1724 Chestnut St., Phila. 3, Pa.

FREE SAMPLE: Fill out the coupon and mail today for big, free sample and brochure.

Name_____

Address_____

City_____ State_____

FMM-11

NEW AUXILIARY EQUIPMENT

Begins on page 164

Combination Oil-Gas Burner

Maybe your public utility can supply you with low-cost gas. Yet you hesitate to convert, since the gas is sold on interruptable or curtailable service. One answer to this problem is the new line of five Hev-E combination oil and gas burners. These units burn either gas or oil efficiently. They can be readily switched from one fuel to the other at a moment's notice.

Models range from 720,000 to 8,700,000 maximum Btu. gas burned. All models have low-fire start on either gas or oil. The two larger sizes provide full modulation between high and low fire. Electronic controls monitor pilot flame. Forced air draft system uses a single blower for all combustion air.

Cleaver-Brooks Co., 326 E. Keefe Ave., Milwaukee 12.

Liquid-Phase Heat Transfer Units

Hydrotherm heat transfer units operate at temperatures up to 800 degrees F. Packaged units include either boiler or heater, centrifugal pump, valves, and controls, all mounted on a common frame.

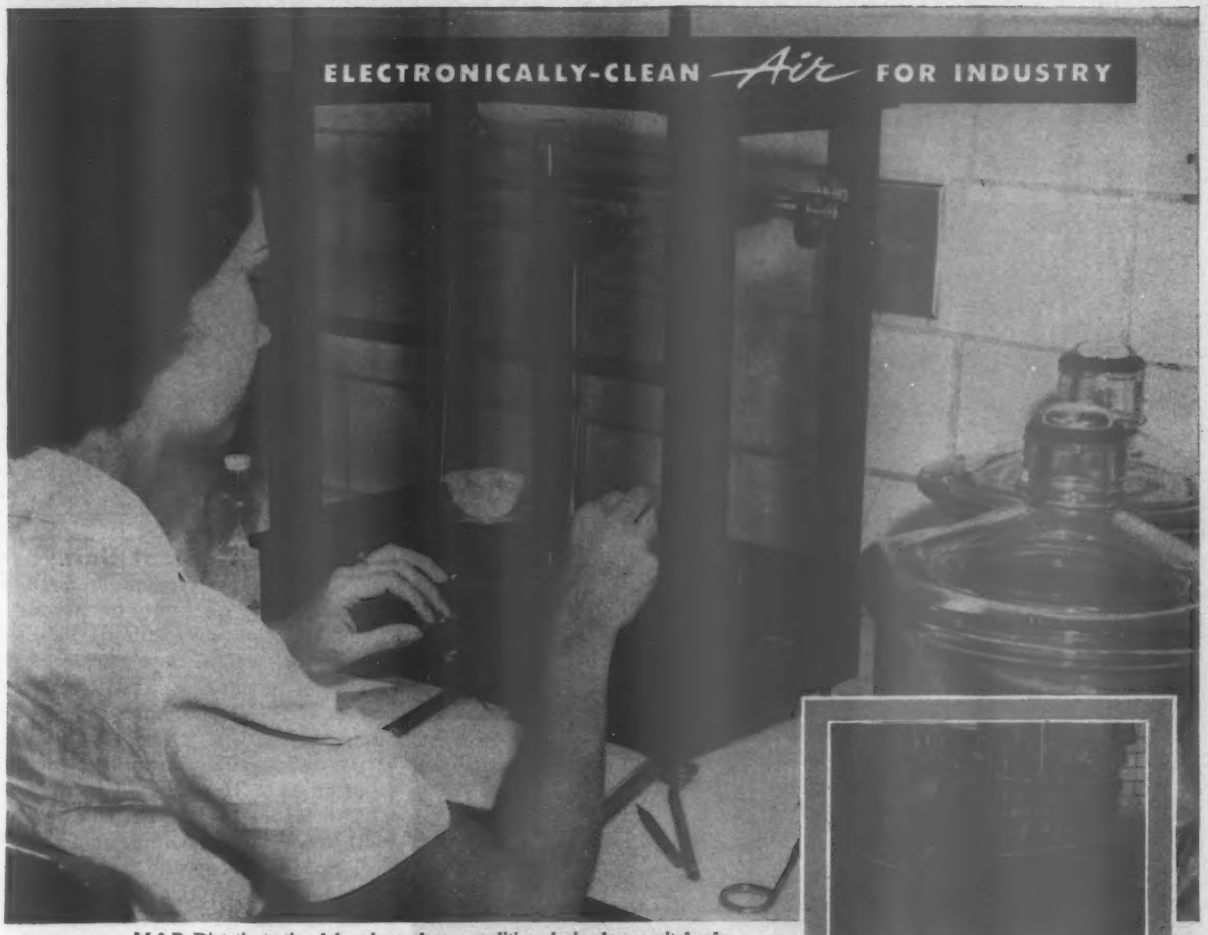
Electric heaters range from 3 to 75 kw. Gas heaters (you can adapt them to oil firing, too) have ratings from 250,000 to 1,000,000 Btu. per hour. Circulating pumps for these units will handle from 1½ to 120 gpm.

For high circulation temperatures, high capacity flow, you can get specially tailored units with coal-, gas-, or oil-fired boilers rated up to 20,000,000 Btu. per hour.

Price (for 1,000,000 Btu. packaged unit): about $10,000.

American Hydrotherm Corp., 33-70 12th St., Long Island City 6, N. Y.

Turn the page



M & R Dietetic testing lab, where clean, conditioned air plays a vital role.

HOW SUPER-CLEAN AIR GUARDS QUALITY AND PRODUCTION

Manufacture of baby foods requires exceptional standards of cleanliness. Every vessel must be sterile—and the air itself pure. M & R Dietetic Laboratories, makers of CEREVIM baby cereal and SIMILAC powdered infant food, insisted on *really clean* air. So PRECIPITRON®—the *electronic* air cleaner—was installed. Now they remove harmful contaminants so small that they can be seen only with the finest Ultra Microscope.

PRECIPITRON also increases production. In one separating process, 20% of the dried milk was once discarded because air-borne contaminants passed through mechanical air filters. Now 100% is useable, and is better graded too. In the testing lab, precisely-controlled humidity and temperature help improve product uniformity and increase the efficiency of the technical staff.

There's a complete line of Westinghouse equipment to help you *put air to work*—with electronic air cleaning, air handling, or air conditioning. Contact your local Westinghouse-Sturtevant office, or write Westinghouse Electric Corporation, Sturtevant Division, Hyde Park, Boston 36, Massachusetts.

YOU CAN BE SURE...IF IT'S Westinghouse

J-80229

Westinghouse Hermetically-Sealed air conditioning compressors can be installed in an unventilated space.

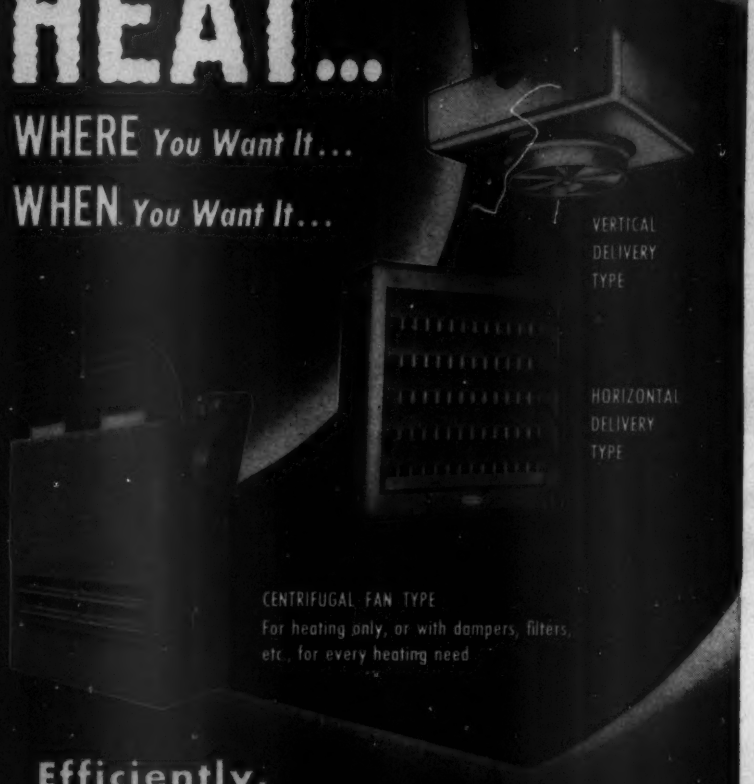
PRECIPITRON stops dirt *before* it enters the building. Its efficiency is triple the best mechanical cleaner.

There's nothing to remove from PRECIPITRON but dirt. It's periodically washed down drain with a water hose.

HEAT...

WHERE You Want It...

WHEN You Want It...



Efficiently, Economically with

AIRTHERM *Steam* UNIT HEATERS

Efficient, dependable, economical heating performance . . . that's what you get with individually controlled Airtherm Steam Unit Heaters. The long life coils in Airtherm Unit Heaters have copper tubes and copper headers brazed into an integral heat transfer unit.

Regardless of whether your factory, shop or warehouse conditions require the horizontal, vertical or centrifugal fan type model, uniform heat is assured at a minimum of cost.

Write for Bulletin 1208B.

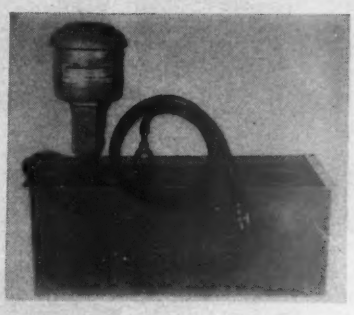
SEE OUR CATALOG IN SWEET'S

AIRTHERM MANUFACTURING COMPANY
751 South Spring Avenue
St. Louis 10, Missouri

For Heating Satisfaction . . . Think First of AIRTHERM

NEW AUXILIARY EQUIPMENT

Begins on page 164



Portable Coolant Unit

You can get a portable Shellback pumping unit to supply coolant to single-spindle drill-presses, lathes, broaches, and cut-off machines. The compact Model 10-10 will pump 30 gpm. against a 10-ft. head. Unit capacity is enough for ample cooling of an 8- or 10-spindle drill press. The Model 10-10 will feed up to three or four machines at a time.

Special Neoprene bearing is said to be practically indestructible, and not affected by any coolant. Maker says abrasives cannot embed themselves in the bearing, so there's little or no wear on pump shaft.

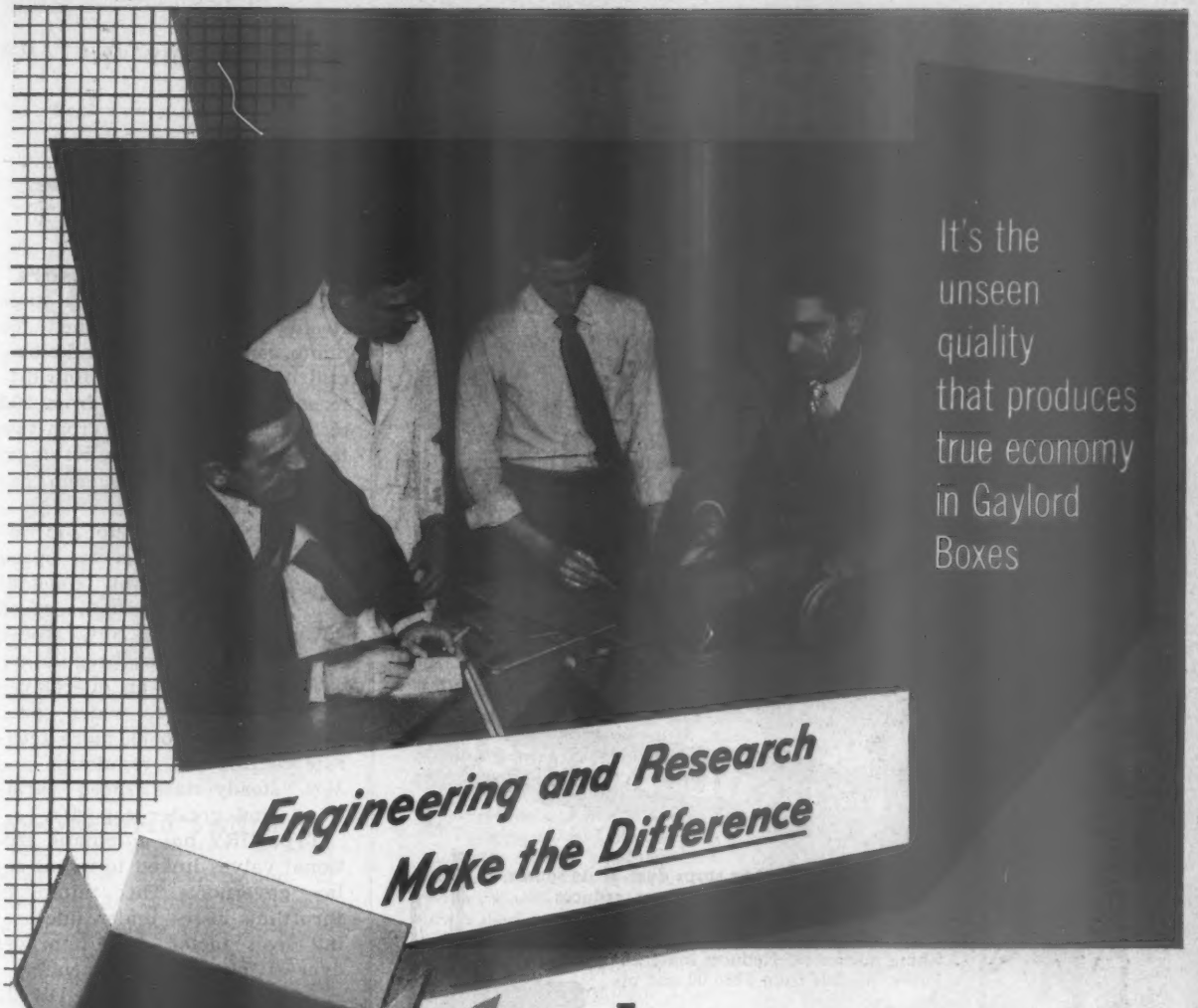
Self-contained unit is powered by a ¼-hp., 110-volt, 60-cycle motor. Tank holds 11 gallons, contains chip screen and sediment baffle. Six feet of hose, equipped with flexible shut-off nozzle.

Shellback Mfg. Co., 1320 E. Elza, Hazel Park, Mich.

•

LIQUID-CHEMICAL PUMP of Allis-Chalmers Mfg. Co., 1126 S. 70th St., Milwaukee, will handle chemical liquors, corrosives, and hot solutions. Units come with capacities up to 1200 gpm., heads to 250 feet, and temperatures to 500 degrees F. Pumps are pedestal-mounted type, have oil-lubricated bearings. Available in standard or special materials, with stuffing box or mechanical seal, with direct coupling or V-belt drive.

Turn the page



Engineering and Research Make the Difference

All shipping containers of corrugated or solid fibre look very much alike before they're shipped. The appearance and condition of the merchandise when it reaches the final destination tell the story of true packaging economy.

The creative research and special engineering devoted to each type of container by Gaylord specialists assure better protection for all products traveling in Gaylord Boxes.

Call the Gaylord Sales Office nearest you for prompt packaging service.

CORRUGATED AND SOLID FIBRE BOXES
FOLDING CARTONS
KRAFT BAGS AND SACKS
KRAFT PAPER AND SPECIALTIES

Gaylord Boxes

GAYLORD CONTAINER CORPORATION
General Offices: ST. LOUIS

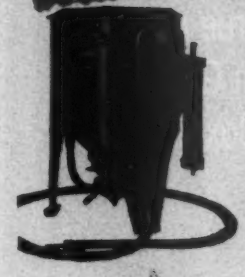
New York • Chicago • San Francisco • Atlanta • New Orleans • Jersey City • Seattle • Indianapolis • Houston • Los Angeles • Oakland
Minneapolis • Detroit • Columbus • Fort Worth • Tampa • Philadelphia • Cincinnati • Des Moines • Oklahoma City • Portland • St. Louis
Greenville • San Antonio • Memphis • Kansas City • Bogalusa • Milwaukee • Chattanooga • Weslaco • New Haven • Amarillo
Appleton • Hickory • Greensboro • Sumter • Jackson • Miami • Omaha • Mobile • Dallas • Little Rock • Charlotte • Cleveland

Here's how Pangborn

Solves these Problems

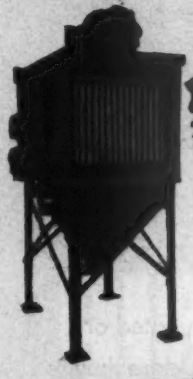
with this modern equipment

BLAST CLEANING!



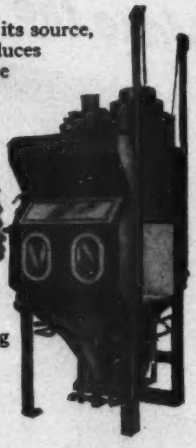
Blast Cleaning Cabinet quickly and easily cleans rust, grime, dirt, paint, etc., from metal parts. Produces a clean, smooth surface on pieces up to 60" x 36". Models available from $315.00 and up.

Blast Cleaning Machine not only removes rust, dirt, scale, etc., but is ideal for maintenance and many other uses. Cleans large objects such as bridges, structural work, tanks before painting. Six sizes, portable or stationary, from $170.00 and up.



DUST COLLECTING!

Unit Dust Collector stops dust at its source, minimizes machine wear and tear, reduces housekeeping and general maintenance costs. Solves many grinding and polishing nuisances. Reduces material losses. Models from $286.00 and up.



PRECISION FINISHING!

Hydro-Finish Cabinet uses liquid blast, eliminating dust, and reduces costly hand polishing, cleaning and finishing of molds, dies, tools, etc. Removes scale, discoloration and directional grinding lines, prepares surfaces for plating and coating. Holds tolerances to .0001". Models from $1295.00 and up.

LOOK TO PANGBORN FOR THE LATEST DEVELOPMENTS IN BLAST CLEANING AND DUST CONTROL EQUIPMENT

Pangborn

MAIL COUPON for full details

(Check for more information)

- ☐ Blast Cleaning Cabinets
- ☐ Blast Cleaning Machines
- ☐ Unit Dust Collectors
- ☐ Hydro-Finish Cabinets

PANGBORN CORP., 2100 Pangborn Blvd., Hagerstown, Md.

Gentlemen: Please send me more information on the equipment I've checked at the left.

Name.....

Company.....

Address.....

City.....Zone.....State.....

NEW AUXILIARY EQUIPMENT

Begins on page 164

Steam Turbines for Pumps, Compressors

Latest line of G-E multi-stage steam turbines is designed for pump, compressor, fan, and blower drives. Units come in four different models, ranging from 200 to 5000 hp. They have from two to ten stages, depending on steam conditions, application, and desired efficiency.

Type DP is for equipment operating within a narrow speed range at a reasonably constant load factor. Its hydraulic speed governor provides 30% speed range and 6% speed regulation.

Type DR, with an oil-relayed governor, provides wider speed range (up to 6 to 1), more accurate control (4% regulation and ½% steady-state speed variation), and greater capacity.

Type DRV has automatic sectional valves linked to its oil relay governor. This minimizes throttling losses under fluctuating load factor, and improves over-all heat-cycle efficiency.

A fourth model, the DRVX, provides process steam at a steady pressure.

General Electric Co., Schenectady 5, N. Y.

Hydraulic Control Valve for Multiple Operations

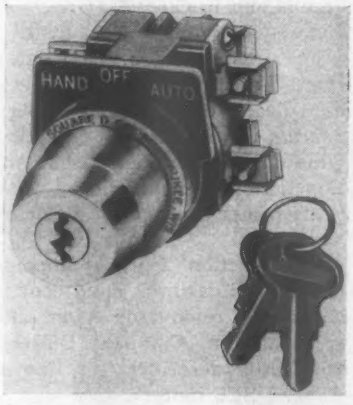
A line of heavy-duty, lightweight spool - and - sleeve - type valve is designed for multiple-control operations on machine tools. These valves can actuate two single-acting lifting cylinders or one double-acting cylinder. Control levers can be operated by one hand, either independently or simultaneously.

Valves operate at working pressures up to 1500 psi., with capacity of 6 to 10 gpm. Maker says you can adapt these valves to a wide range of jobs.

American Industries Co., Dept 90, Bristol, Pa.

Begins on page 154

ELECTRICAL EQUIPMENT



Key-Operated Switch

This key-operated selector switch prevents operation of equipment by unauthorized personnel. It comes as a 2- or 3-position switch. A variety of cams and contact blocks can meet the requirements of almost any switching application. Every combination of key withdrawal (locking) positions for 2- and 3-position selector switches is available. Company Bulletin 9001 gives all the details.

Square D Co., 4041 N. Richards St., Milwaukee 12.

•

TWO NEW MAGNETIC STARTERS extend the Arrow-Hart line to handle reversing and multi-speed motors. The starters—Type RAR (reversing) and Type RAS (multi-speed)—come in sizes 0, 1, 2, 3, and 4. You can get NEMA Type I, IV, VII, and IX housings. Greatly reduced size and weight, increased operating efficiency, and simplified straight-through wiring are claimed by the maker, The Arrow-Hart & Hegeman Electric Co., Hartford, Conn.

Turn the page

Pangborn DUST CONTROL

Turns Dust Into Profits!

At Flury Foundry, this small and inexpensive Pangborn Dust Collector stops dust caused by blast cleaning operations . . . pays its own way in increased efficiency.

At Dodge Cork Company, a Pangborn Dust Control System salvages $5000.00 worth of cork dust every year from some 40 sawing and polishing machines.

At Landers, Frary & Clark, a Pangborn Dust Collector like this traps 522 cu. ft. of cast iron dust per day . . . company records prove maintenance costs are lower than ever before.

Dust is no problem for plants with Pangborn Dust Control. As these three cases (picked from hundreds in our files) show, a Pangborn Dust Control System *saves money* on maintenance when dust is a nuisance, saves money when dust has salvage value.

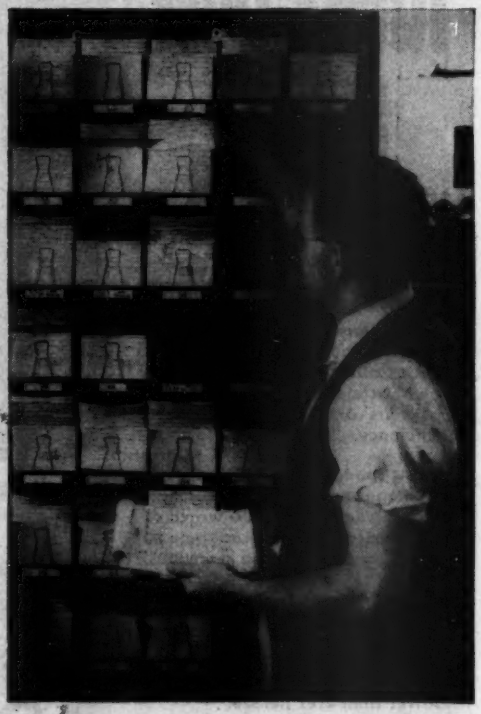
FIND OUT TODAY how you can *save money* with Pangborn Dust Control. Write for your copy of Bulletin 909-A to: PANGBORN CORPORATION, 2100 Pangborn Blvd., Hagerstown, Md.

Look to Pangborn for the latest developments in Dust Control and Blast Cleaning equipment.

Pangborn DUST CONTROL

STOPS THE DUST HOG from stealing profits

Bulletin Now Available on MACHINE LOADING, SCHEDULING DISPATCHING and JOB ASSIGNMENT



...outlining procedure widely used for these cost-cutting results:

Visual Scheduling . . . a glance at board shows work ahead for each machine or man.

Order Sequence . . . quickly indicated by arrangement of tickets representing orders.

Schedule Changes . . . easily specified by rearranging tickets in revised sequence.

No Delay Between Planning and Dispatching . . . no lists or records to write.

Operation According to Plan Assured.

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THE McCASKEY REGISTER CO.
ALLIANCE, OHIO
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The McCaskey Register Co., Watford, England

NEW ELECTRICAL EQUIPMENT

Begins on page 175

Explosion-Proof Motor

Latest explosion-proof motor of U.S. Electrical Motors comes in capacities from 3 to 75 hp. Units carry Underwriters' label in Class I, Group D, for highly inflammable gases and volatile liquids and in Class II, Groups F and G, for combustible dusts.

Features include: elongated spark-arresting bearing sleeves, high-draft ventilation, Lubriflush bearings, asbestos - protected windings, and sealed terminals. The motor is completely sealed, gives protection against external hazards.

Construction features include normalized castings, solid centricast rotor, removable cover, and split hub fan. Company Bulletin 1629 fully describes this line of SE and SES motors.

U. S. Electrical Motors, Inc., 200 E. Slauson Ave., Los Angeles 54.

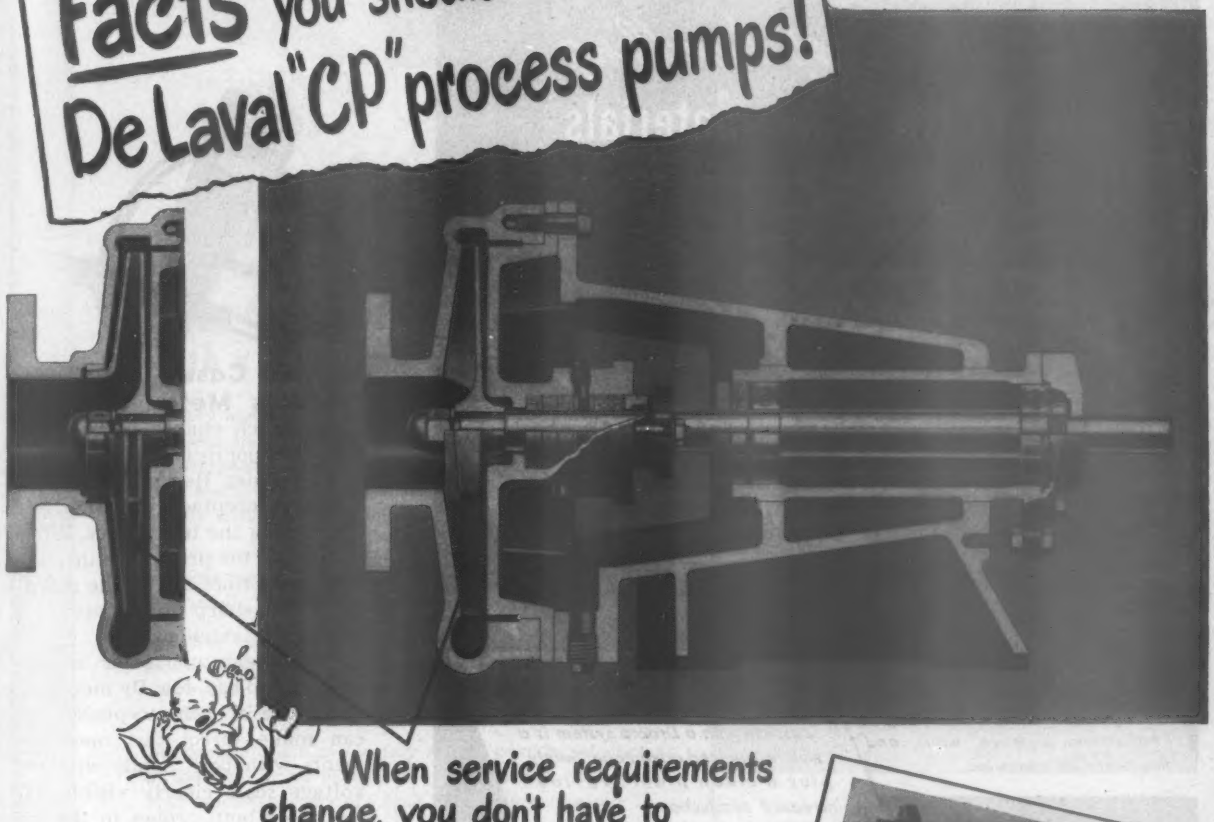
•

WINDING-INSULATION TESTER for d-c armatures, series field coils, and low-impedance a-c stator coils is available from General Electric Co., Schenectady 5, N. Y. The tester detects and helps locate turn-to-turn, coil-to-coil, and winding-to-ground faults in armatures of any size and rating. The tester will check out an armature in 3 or 4 minutes. All the operator has to do is to check the surge wave on a 'scope screen for proper shape and amplitude.

TWO-CIRCUIT LOAD CENTER of Murray Mfg. Corp., 1250 Atlantic Ave., Brooklyn 16, will continuously carry 100% of its full rated load. The 55-amp. load center can be used as a main disconnect in place of a comparable 60-amp. fused switch. You can use it on single-phase lighting circuits. The two fully magnetic breakers are rated each at 50 amperes, single pole, 120 volts a-c.

Turn the page

Facts you should know about De Laval "CP" process pumps!



When service requirements change, you don't have to buy a whole new pump!

The De Laval CP pump can be quickly converted from closed to open impeller (or vice versa) by changing the pump volute and impeller only. This standardization also means you can keep your stock of spare parts to a minimum. Three sizes of shafts, shaft lock-nuts, bearings, bearing cartridges and pedestals *fit all nine sizes of De Laval CP pumps.*

Did you also know?...

that the external adjusting screw can be used to pull the impeller off the shaft? It is quick, easy and requires no special tools.

Shims and fussy fits are old fashioned...

When you have to compensate for wear between the impeller and case, it is only necessary to face off these parts, reassemble the pump and position the impeller with the external adjusting screw provided for that purpose. No shims required—no fussy fits.

DE LAVAL STEAM TURBINE CO., TRENTON 2, N. J.

TURBINES • HELICAL GEARS • CENTRIFUGAL BLOWERS AND COMPRESSORS
CENTRIFUGAL PUMPS • WORM GEAR SPEED REDUCERS • IMO OIL PUMPS

50th DE LAVAL Anniversary

CPP-5

Check These Advantages of

DRACCO Pneumatic Conveyors

for low-cost handling

of YOUR Bulk Materials

When selecting equipment to handle your bulk granular or powdered materials, your logical choice is a "Performance Proved" Pneumatic Conveyor, engineered by Dracco.

LESS LABOR

The automatic, continuous action of a Dracco Pneumatic Conveyor permits sizeable reductions in manpower requirements. In unloading a hopper bottom car for example, one man need be present only 25% of unloading time.

NO DUST

Completely enclosed Dracco Pneumatic Conveyors mean a clean plant, no product contamination, and no material losses.

SPACE-SAVING

A Dracco Pneumatic Conveyor requiring only the space of a 6 inch pipe, releases valuable plant areas for productive use. Vertical heights, horizontal distance, walls, and floors are no obstacles.

GREATER SAFETY

The high operator safety factor possible with a Dracco system is a well-recognized advantage. Safety plus a clean plant provide increased production.

LOW MAINTENANCE

Simplicity and few moving parts reduce maintenance costs to an absolute minimum.

LOWER MATERIAL COST

Another cost-saving feature is that a Dracco system permits buying materials in low-cost bulk form.

Dracco Pneumatic Conveyors are "Performance Proved". High operational efficiency of each installation is assured by exact engineering to individual requirements. If your materials handling problem involves the movement of bulk chemicals, grains, or other granular or powdered materials, you can profit from the advantages provided by Dracco Pneumatic Conveyors.

DRACCO CORPORATION

4075 E. 116th St., Cleveland 5, Ohio

415 Lexington Avenue, New York 17, N. Y.

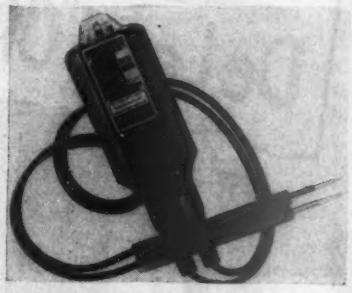
DRACCO

Performance Proved

PNEUMATIC CONVEYORS

NEW ELECTRICAL EQUIPMENT

Begins on page 175



Slotted Case Protects Meter Probes

Not much chance of breaking the probe points of this Wigginton voltage tester. Its molded case has a slotted receptacle on either side for holding the test probes. When not in use, the probes are inserted into the bottom end of the receptacle. The sharp probe points are completely shielded.

The Wigginton meter is safe and easy to use, too. By mounting one probe in each receptacle, you can make direct test measurements with both hands with the voltage scale clearly visible. By mounting both probes in the top of the slotted receptacles, you can make line-to-ground and similar tests with one hand. By inserting the leads through the receptacles, you can do overhead testing with the scale face up at eye level.

Voltage range covers 110/220/440/550 volts a-c and 125/250/600 volts d-c. You can get these testers for low voltage and 400 cycle systems, too.

Square D Co., 6060 Rivard St., Detroit 11.

•

SELENIUM RECTIFIERS with high current and voltage capacities are now being made by Syntron Co., 480 Lexington Ave., Homer City, Pa. An extra-large rectifier cell gives these compact units ratings of 50 kw. and more. Larger cell size means fewer parallel elements for a given output, also keeps weight at a minimum.

Turn the page

Century Motors'

Unusual Freedom from Vibration Helps Maintain Close Tolerances— With a Minimum of Rejects

Century motors are designed to help you get the accuracy that was built into your modern production machines. They are ruggedly built, carefully machined and well balanced both mechanically and electrically. Century motors are widely known for their unusual freedom from vibration.

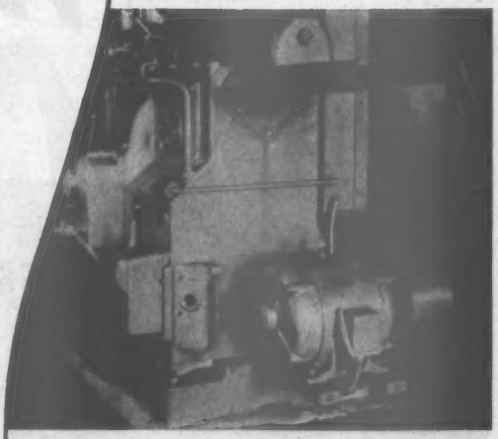
Century motors have wide acceptance from BIG NAME machine tool manufacturers because they mount squarely and solidly and operate with smooth, quiet precision.

You may select Century motors in: open drip proof — splash proof — or totally enclosed fan cooled construction to assure uninterrupted production against various atmospheric hazards.

The complete line of Century motors permits selection of the right motor to meet the requirements of your machines. They are built in a wide range of sizes from 1/6 to 400 horsepower. Specify Century for all your equipment.

CENTURY ELECTRIC COMPANY
1806 Pine St., St. Louis 3, Missouri
Offices and Stock Points in Principal Cities

75 Horsepower Century drip proof motor on a copper tube drawing machine.



7½ Horsepower Century drip proof motor on a crank shaper in a tool room.

7½ Horsepower Century drip proof motor on a special production lathe.

Century SERVICE
Is Near Any CENTURY Motor Driven Equipment

Prompt Service is offered by CENTURY'S National Network of more than 200 Authorized Service Stations, supervised by 28 Century Sales offices.

1. Facilities for immediate exchange of most CENTURY standard ratings of standard construction are available at CENTURY Authorized Service Stations.
2. CENTURY Authorized Service Stations are qualified and equipped to service and repair any piece of CENTURY apparatus.
3. Genuine CENTURY renewal parts are available at CENTURY Service Stations, CENTURY Parts Distributors and at the factory in St. Louis.

Century C MOTORS 700

Century Electric Company is celebrating its 50th Year in the electrical industry

THE NORTHERN PACIFIC TRANSPORT COMPANY

. . . a very prominent western transportation company, operates a large number of motorized vehicles in the states of Montana and Washington. The operation of their equipment is extremely severe due to mountain grades and wide temperature variations.

They say . . . "THIS LUBRICANT CUT OUR PARTS REPLACEMENT 50%"

Quoting from their letter of October 17, 1949:

"We ran our first test on LUBRIPLATE #22 in March, 1945, in 3000 series Timken tandem-drive, worm axles. That year we experienced considerable trouble with wartime drivers and very poor roads, causing us no end of trouble. The oil that we were using set up to tar in 10 to 15 thousand miles. The LUBRIPLATE #22 proved so satisfactory we installed it in all our worm-gear, hypoid, and two speed axles. This enabled us to change our oil-change period from 15,000 miles to 40,000 and on some applications, depending on speeds and temperatures encountered, we raised the change period to 60,000 miles, or approximately once a year. Our overhaul periods were stretched from 50,000 to 100,000 miles, and repair parts bill cut 50% with the increased mileage."

Naturally with the economies that this company enjoyed through the use of LUBRIPLATE Lubricants on worm-axles, they extended the use of LUBRIPLATE to other parts of their equipment. The savings in parts, time, money and increased efficiency are equally startling. Let us send you the entire report of where they are now using LUBRIPLATE and what it is saving them.

LUBRIPLATE Lubricants will prove just as effective for you in your plant in reducing friction and wear. They are different from any other lubricants you have ever used. They save power, prevent rust and corrosion and definitely arrest progressive wear.

LUBRIPLATE Lubricants are available from the lightest fluids to the heaviest density greases. There is a LUBRIPLATE Product best for your every lubrication requirement. Let us send you CASE HISTORIES of savings that others in your industry are making through the use of LUBRIPLATE Lubricants. Write today.

LUBRIPLATE DIVISION
Fiske Brothers Refining Company
Newark 5, N. J. Toledo 5, Ohio

DEALERS EVERYWHERE . . . CONSULT YOUR CLASSIFIED TELEPHONE BOOK

LUBRIPLATE THE MODERN LUBRICANT

NEW ELECTRICAL EQUIPMENT

Begins on page 175

3000-Watt Diesel Electric Power Plant

A 4-cycle, single-cylinder, air-cooled engine powers the new Onan 3000-watt diesel-electric unit. The plant generates a 115-volt, 60-cycle, single-phase supply. Fuel consumption, says maker, is about 0.155 gallon of low-cost furnace oil per kilowatt-hour at full rated load.

Onan engineers say that simple design makes the unit easy to operate. Push-switch control for electric cranking, manual compression release, and an electrically heated glow-plug for cold-weather starting are provided.

D. W. Onan & Sons, Inc., University Ave. S.E. at 25th St., Minneapolis 14.

Selenium Rectifier Battery Charger

The Bart-Messing charger will handle either lead acid or nickel alkaline industrial truck batteries. The unit automatically disconnects itself from the a-c line and from the battery at the end of the charging period.

A tandem transfer control permits the charging of more than one battery with one setting. When the first battery is charged, the control begins charging the second unit. The charger covers 4 square feet, stands 4 feet high.

Bart-Messing Corp., 229 Main St., Belleville 9, N. J.

•

CORD SET WITH GROUNDING PLUG eliminates need for grounding lead or strap. 8-ft. cord has a molded-on plug with a special pin for positive third-wire grounding. Rubber-jacketed conductors are No. 16 AWG, stripped for easy installation. General Electric Co., Construction Materials Dept., Bridgeport 2, Conn.

Turn the page

HERE'S WHY ACCOUNTANTS SAY

SPECIAL GREASE-PROOF KENTILE is ideal for lowering maintenance costs

...can be installed for approximately 40¢ a sq. ft!*

Petroleum oils and greases won't stain or soften SPECIAL KENTILE Floors in machine shops, manufacturing areas, laboratories and other spaces where grease and oil are important maintenance factors. That's why maintenance expenses are reduced with floors of SPECIAL KENTILE . . . it's impervious to alcohols, alkalis, most acid solutions as well as petroleum oils and grease. Like regular Kentile it can be installed anywhere . . . over smooth concrete, wood or metal floors . . . even below grade in direct contact with the earth!

Because SPECIAL KENTILE now comes in bright, modern colors, it's the perfect floor to provide a feeling of light and air in plants, working areas, rest rooms, cafeterias and locker rooms. And, a cheerful, pleasant atmosphere means increased efficiency and greater production!

KENTILE adds safety to your floors. According to the U. S. Bureau of Standards no floor is safer to walk on than asphalt tile that does not have a high gloss finish. SPECIAL KENTILE is virtually fireproof, too.

KENBASE completes your floor. Apply it against any smooth wall where it meets the floor to seal cracks and crevices. Never paint it and never worry about marks, chipping or wear.

*Prices for Special Kentile for ¼" thickness may be considerably lower or slightly higher depending upon the size and condition of your floor and the freight rates to your city. Consult your Kentile Dealer for a FREE estimate. He's listed under FLOORING in your classified phone directory. In Canada at T. Eaton Co., Ltd.

SPECIAL GREASE-PROOF KENTILE®

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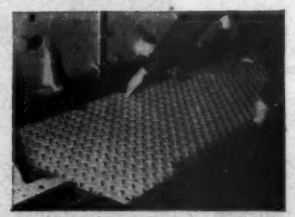
"Don't worry, my dear. The trays here are all made of slip-resistant 4-WAY Safety-Plate."

For greater safety under foot,
in your plant and on your products

Inland 4-Way® Safety Plate

Adds Strength



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STOCKED BY LEADING STEEL WAREHOUSES

Begins on page 154

LIGHTING

Reflector-Lamp in One Detachable Unit

The Turnlox detachable reflector is an aid to simpler lamp cleaning and maintenance. The Turnlox permits quick removal of reflector and lamp from the hood containing the wiring terminal base. All you do is press upward slightly on the reflector rim, then turn the reflector a quarter turn to the right.

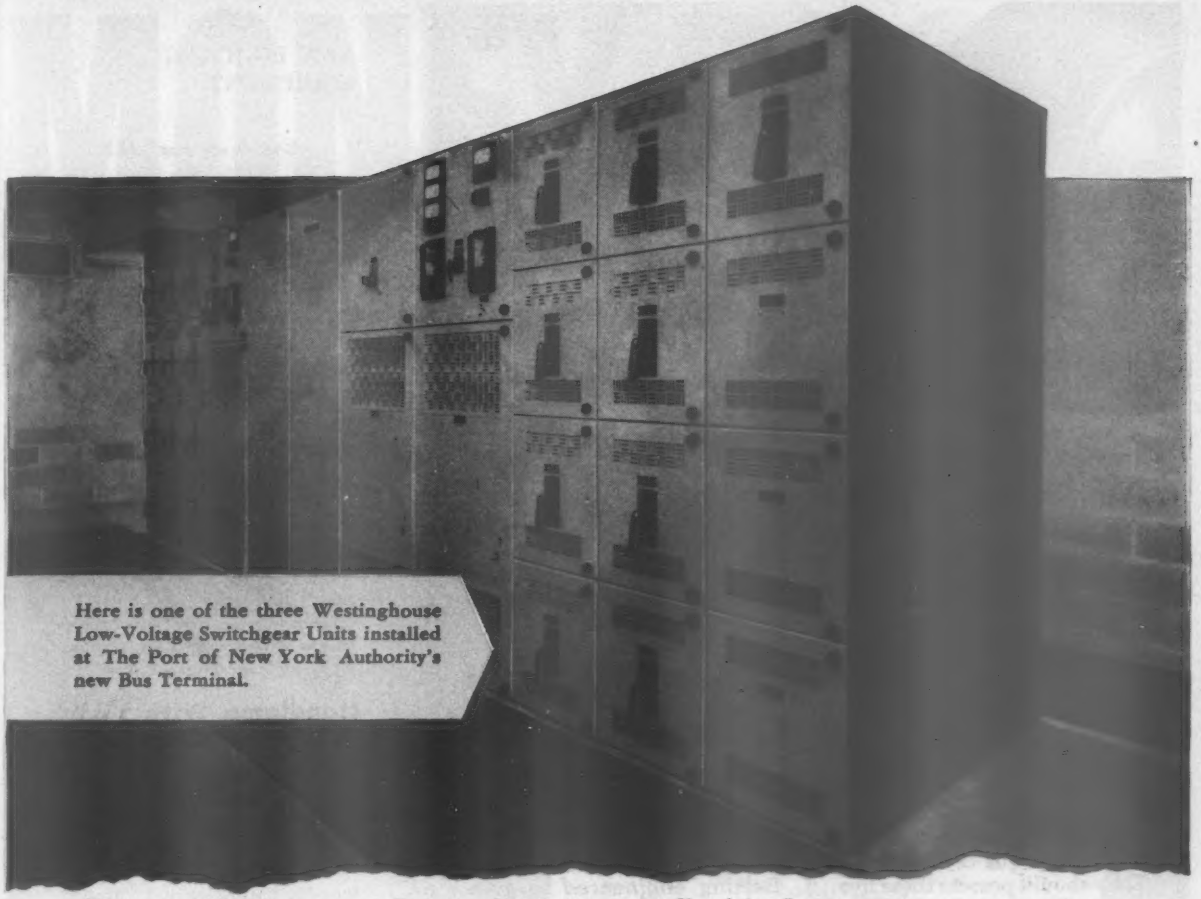
A 3-point bayonet coupling connects hood and reflector. Electrical and mechanical connections are made simultaneously when the bayonet lock engages. There's automatic polarization of the terminals.

Benjamin Electric Mfg. Co., Des Plaines, Ill.

•

FLUORESCENTS FOR INSPECTION and assembly benches use parabolic reflectors of specular Alzak aluminum for high-level, well-distributed lighting. The 8151 Bench Light comes in 4- and 8-ft. lengths. Fixtures have mounting holes and knockouts for mounting directly to the underside of shelves above the benches, or for suspension from stems or chains. Garden City Plating & Mfg. Co., 1750 N. Ashland Ave., Chicago.

Turn the page



Here is one of the three Westinghouse Low-Voltage Switchgear Units installed at The Port of New York Authority's new Bus Terminal.

Westinghouse Low-Voltage Switchgear serves modern, new Bus Terminal of The Port of New York Authority

In making this new Bus Terminal the most functional, most modern of its kind, The Port of New York Authority sought to achieve improvements in every phase of terminal operation. With so much depending on electrical power, the protection of vital electrical services was naturally a prime consideration. Note what this user has to say about Westinghouse Low-Voltage Switchgear which was selected for this key function.

"The installations have contributed to the maintenance of unusually good service continuity. Also, our operating personnel have particularly praised the electrical and mechanical interlocking features which assure maximum safety. Maintenance has been negligible."

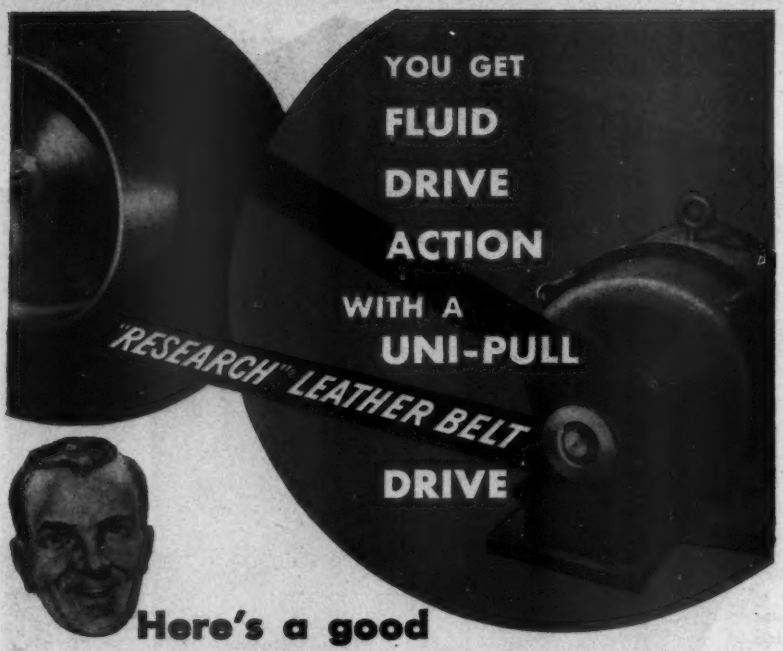
For installations in central stations, industrial plants or large commercial buildings, Westinghouse Low-Voltage Switchgear offers you this same safe, low-cost means of protecting vital electrical services.

For complete information send for Booklet B-2296-D. Contact your Westinghouse representative, or write: Westinghouse Electric Corporation, P. O. Box 868, Pittsburgh 30, Pa. J-60766

YOU CAN BE SURE ... IF IT'S

Westinghouse

LOW-VOLTAGE SWITCHGEAR



Here's a good example of Graton & Knight *Engineered* Flat Leather Belting

Success of your short center pivoted motor base drives depends on the FLUID DRIVE ACTION of the belts you use. They should possess these five quality features:

1. *High Coefficient of Friction* — to grip *across and around* the pulleys.
2. *Flexibility* — to withstand continuous flexing on short centers over small diameter pulleys.
3. *Resiliency*—to absorb starting torque and load shock.
4. *Minimum Permanent Stretch* — to maintain correct tension at all times.
5. *Great Tensile Strength* — to carry peak loads.

These five quality features describe RESEARCH, the premium quality flat leather belt made by a special process to give you FLUID DRIVE ACTION on Uni-Pull and other important drives. It is one example of G&K Leather Belting *engineered* to give more production-power.

Other famous G&K brands, developed through a century of service to industry, include HEART OAK, a rugged, firm belt for shifters and step-cone pulleys; and SPARTAN,® a combination tan resistant to oil, steam, acid and alkali fumes . . .

Let the G&K man help you *"drive it better with leather."*

GRATON & KNIGHT COMPANY
Worcester, Massachusetts

To assist you in engineering a short center drive, be sure to get a free copy of the new Uni-Pull Drive Manual. Write for it on your letterhead.

PREMIUM RESEARCH QUALITY

HEART OAK

SPARTAN®

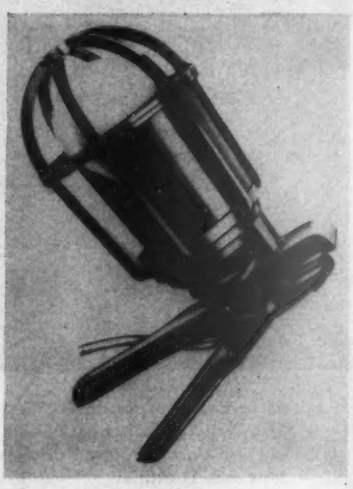
100 YEARS OF SERVICE TO INDUSTRY

YOU CAN DRIVE IT BETTER WITH LEATHER®

GRATON AND KNIGHT® *Engineered* LEATHER BELTING

NEW LIGHTING EQUIPMENT

Begins on page 182



Handlamp With Gripper Fastener

The Gripperline handlamp is convenient and safe to use. The gripper jaws permit the lamp to be clamped right at the work. You can snap it onto beams, pipes, wood, canvas—just about any surface up to 1½ inches thick.

Your workmen can use Gripperline safely in high-voltage areas. Guard, grips, and socket cover are plastic. There is no exposed metal. Unit has been safely tested at 20,000 volts.

P. M. Sales Co., 443 Broad St., Newark 2, N. J.

Mercury Vapor Floodlighting

A new lighting unit brings mercury vapor lamps into the field of outdoor floodlighting. The compact unit is rustproof, weatherproof, weighs 10 pounds. The polished aluminum reflector has been spun over the glass bowl and permanently sealed.

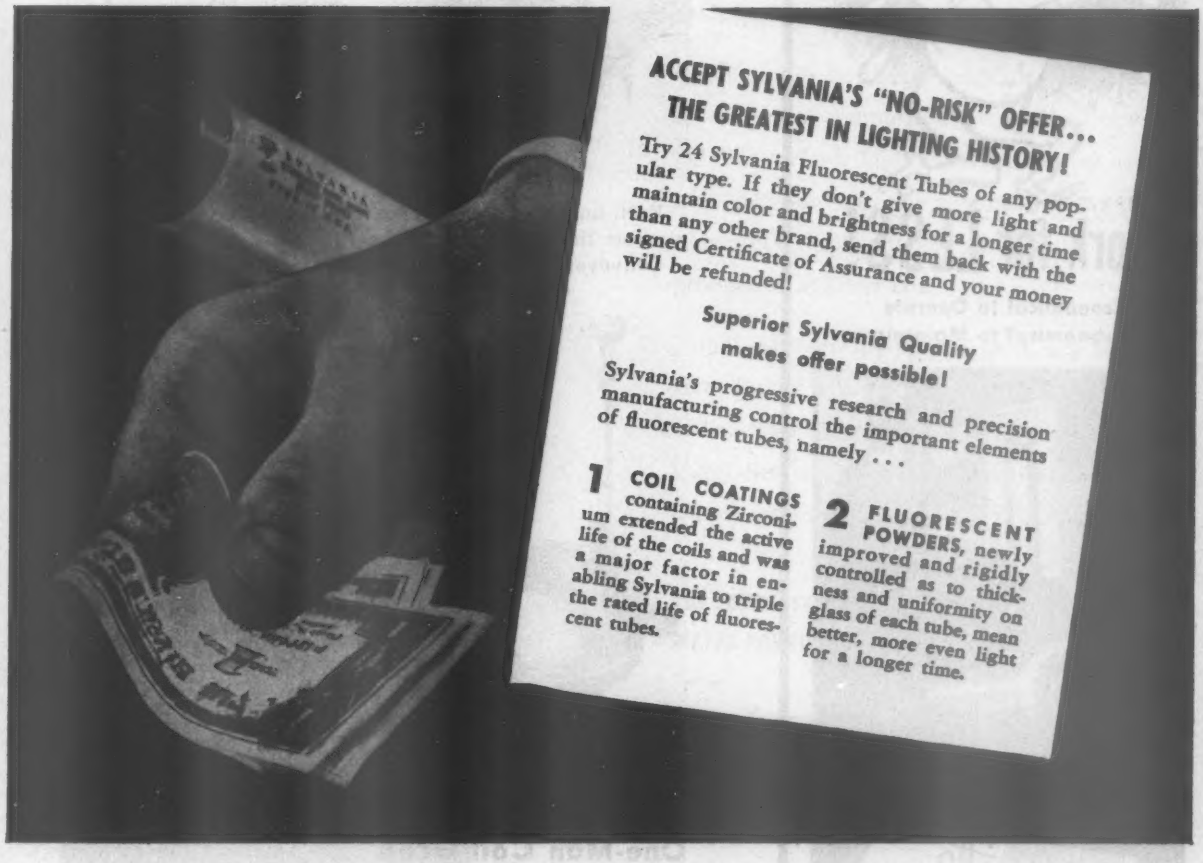
A variety of brackets, poles, and clamp assemblies permit installation at almost any site. The high-intensity, concentrated illumination is said to be suited for protective lighting around plants.

Nepo Mfg. Co., 527 S. Wells St., Chicago 7.

Turn the page

MONEY BACK!

If you don't agree 100% that Sylvania Fluorescent Tubes are the Finest you've ever used!



ACCEPT SYLVANIA'S "NO-RISK" OFFER... THE GREATEST IN LIGHTING HISTORY!

Try 24 Sylvania Fluorescent Tubes of any popular type. If they don't give more light and maintain color and brightness for a longer time than any other brand, send them back with the signed Certificate of Assurance and your money will be refunded!

Superior Sylvania Quality makes offer possible!

Sylvania's progressive research and precision manufacturing control the important elements of fluorescent tubes, namely . . .

1 COIL COATINGS containing Zirconium extended the active life of the coils and was a major factor in enabling Sylvania to triple the rated life of fluorescent tubes.

2 FLUORESCENT POWDERS, newly improved and rigidly controlled as to thickness and uniformity on glass of each tube, mean better, more even light for a longer time.

For outstanding electrical work of any kind, call the Electrical Contractor who displays this emblem

QUALIFIED LIGHTING CONTRACTOR AUTHORIZED SYLVANIA SALES SERVICE

SYLVANIA

Sylvania Electric Products Inc., 1740 Broadway, New York 19, N. Y.

FLUORESCENT TUBES, FIXTURES, SIGN TUBING, WIRING DEVICES; LIGHT BULBS; RADIO TUBES; TELEVISION PICTURE TUBES; ELECTRONIC PRODUCTS; ELECTRONIC TEST EQUIPMENT; PHOTOLAMPS; TELEVISION SETS

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work for LESS!

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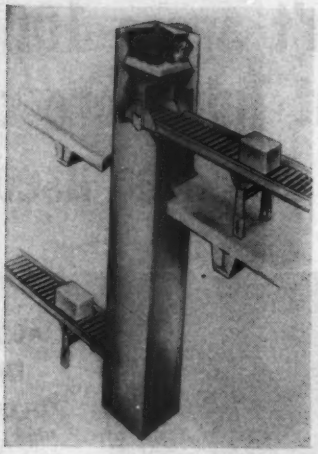
MATERIALS HANDLING



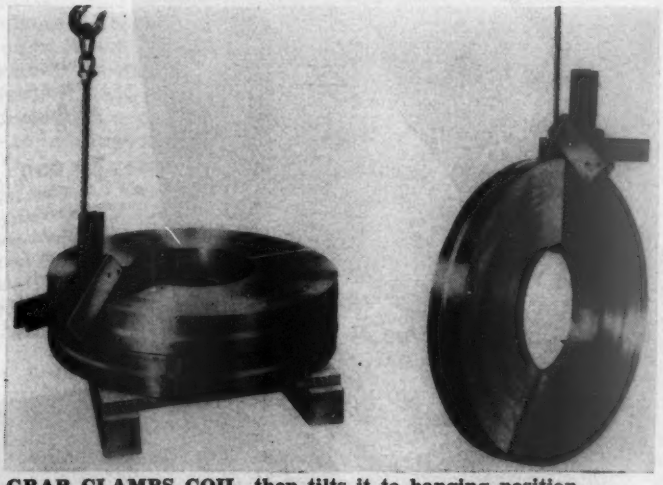
Vertical Lift for Small Unit Loads

This reciprocating lift will handle boxes, cartons, or pallets of near uniform size. Loading or unloading can be done on the same or opposite sides of the lift tower, and is either automatic or manual.

Maker says it can be used efficiently (1) to move materials from one floor to another, (2) to double back conveyor lines in a minimum of space, or (3) to raise conveyed material over obstructions or passageways on the plant floor.

Each unit load, through spacing devices and limit switches, controls the movement of the lift car.

Conveyor Specialty Co., 33 Newport Ave., Quincy, Mass.



GRAB CLAMPS COIL, then tilts it to hanging position.

One-Man Coil Grab

With a Dixon grab, one man can remove individual coils from a pallet load in one easy motion. The grab has a special prong tapered to fit between individual coils in the space made by the coil bands. The opposite jaw rests in the center of the coil. As the crane lifts, the grab automatically adjusts to coil size. Locked by its own weight, the coil then hangs suspended in a vertical position. Grab capacity is 2000 pounds.

Dixon Research, Inc., Materials Handling Div., 2304 23rd Ave., Rockford, Ill.

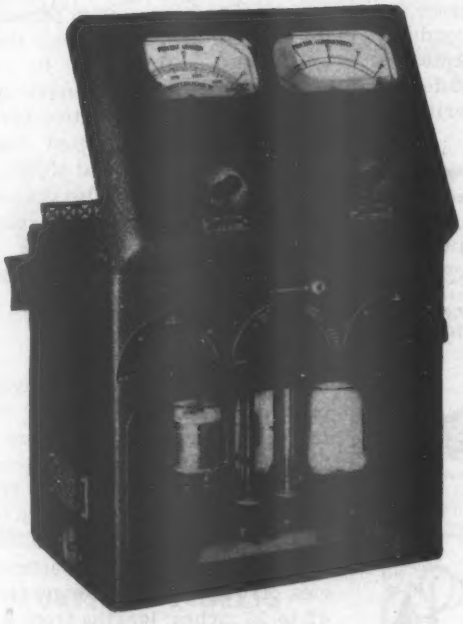
Turn the page

Mobilizing BTU's

Now that the "heat's on" for record production, the calls are increasing for the services of the Cities Service Heat Prover. This scientific instrument gives an accurate, instantaneous and continuous picture of combustion conditions in all types of furnaces.

You'll readily be able to calculate any oxygen excess, waste combustible matter, and potential fuel savings. The results are like an accurate "diagram" of corrective measures needed to conserve heat units for consistently higher production at lower cost.

You'll see profit in applying the Cities Service Heat Prover . . . *not an instrument you buy, but a service we supply!* Call or write your local Cities Service office about arrangements. Or simply return the coupon today.



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Pacemaker T Hydraulic Oils • Optimus Cylinder Oils
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Sixty Wall Tower, Room 191
New York 5, N. Y.

Without obligation please send your booklet, "Combustion Control for Industry."

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Company_____
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CITIES SERVICE
QUALITY PETROLEUM PRODUCTS

NO INSTRUCTIONS NECESSARY WITH THIS EXTINGUISHER!

IT'S A RANDOLPH!

From bracket to blaze in split seconds! No valves to turn, no nozzles to adjust; just point and press your thumb and Randolph's cloud of snowy CO_2 kills fire completely!

Non-damaging Randolph CO_2 evaporates without a trace, is non-toxic, won't conduct electricity, deteriorate or freeze. And *all* Randolph Models are Underwriters' Approved.

A complete line of extinguishers and automatic systems

Learn how Randolph gives your plant panic-proof, positive fire protection! Write Randolph Laboratories, Inc., 4 E. Kinzie St., Chicago 11, Illinois.

RANDOLPH SIMPLIFIED FIRE EQUIPMENT

MATERIALS HANDLING EQUIPMENT

Begins on page 186

Lift Truck for Loading Furnaces

Here's a handling device for speeding up heat-treating operations. It eliminates single-piece loading of parts into heating ovens.

All work to be treated is placed on the frame of the loader. The fork bars of the loader raise the work to the proper height, and insert it into the furnace. For speedy unloading you go through the reverse cycle. You can then wheel the entire load to the quench tank or to the next operation. During the entire cycle the operator is protected from furnace heat by a metal shield.

The furnace loader also doubles as a hydraulic lift truck in other jobs around the shop.

A. D. Alpine, Inc., 11837 Teale St., Culver City, Calif.

•

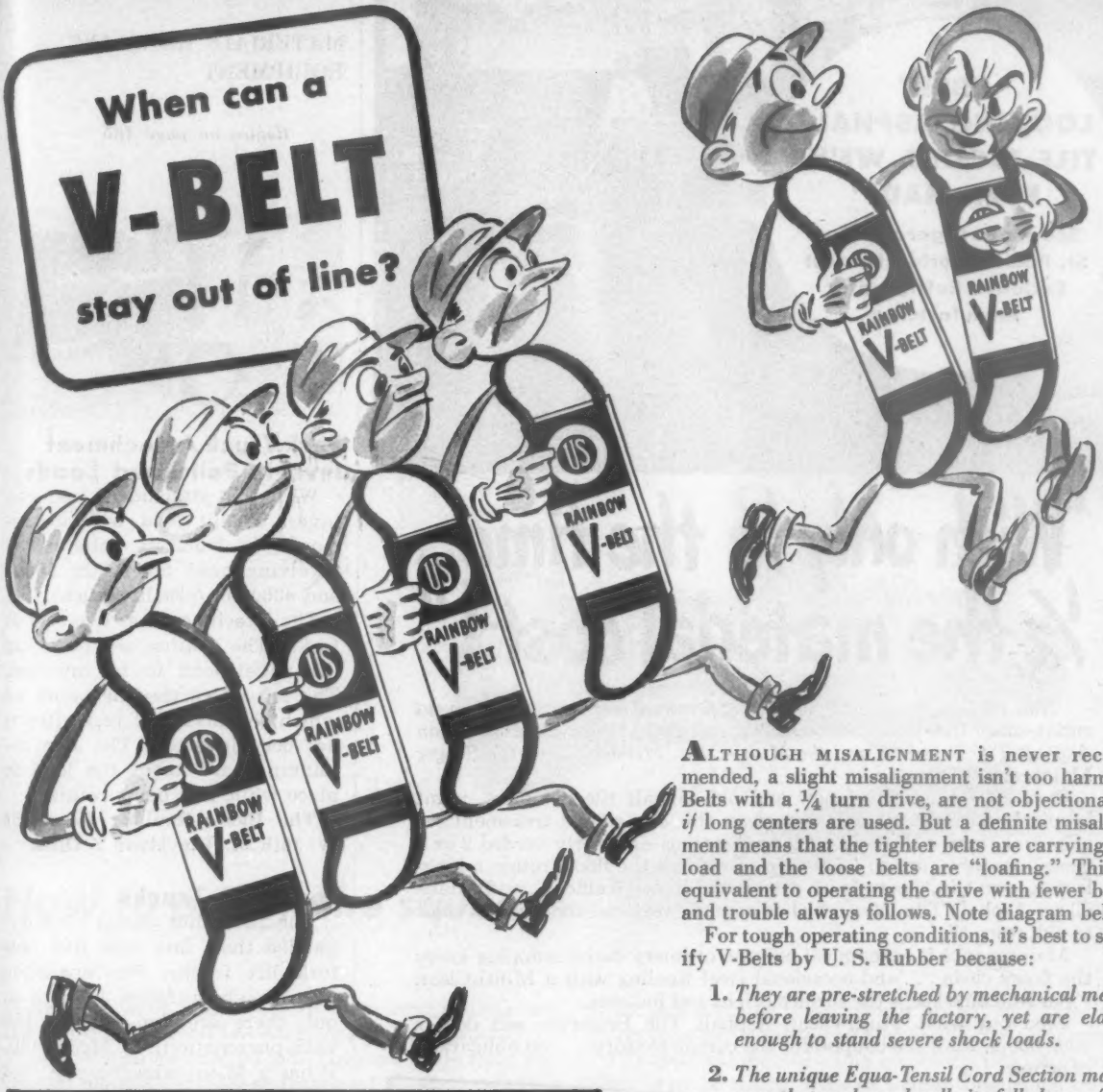
SHAKER CONVEYORS for moving bulk materials at a rate of 100 tons per hour for distances up to 500 feet are being made by Goodman Mfg. Co., Halsted & 48th Sts., Chicago 9. Unit assembly includes drive unit, oscillating trough, and supporting accessories. Trough widths range from 12 to 36 inches; lengths from 6 to 16 feet; depths from 6 to 18 inches. There's a 90-deg. angle trough for turns. Maker recommends system for handling rock, castings, refuse, ore, heavy bulk in general.

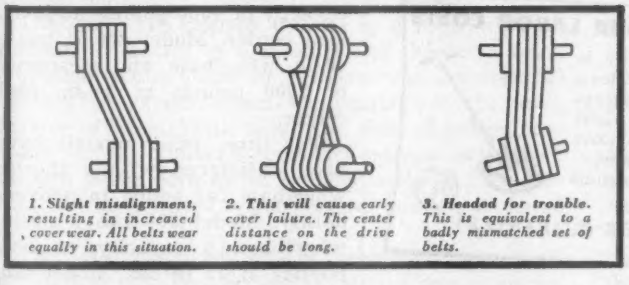
Turn the page

When can a

V-BELT

stay out of line?





1. Slight misalignment, resulting in increased cover wear. All belts wear equally in this situation.

2. This will cause early cover failure. The center distance on the drive should be long.

3. Headed for trouble. This is equivalent to a badly mismatched set of belts.

ALTHOUGH MISALIGNMENT is never recommended, a slight misalignment isn't too harmful. Belts with a ¼ turn drive, are not objectionable, *if* long centers are used. But a definite misalignment means that the tighter belts are carrying the load and the loose belts are "loafing." This is equivalent to operating the drive with fewer belts, and trouble always follows. Note diagram below.

For tough operating conditions, it's best to specify V-Belts by U. S. Rubber because:

1. *They are pre-stretched by mechanical means before leaving the factory, yet are elastic enough to stand severe shock loads.*
2. *The unique Equa-Tensil Cord Section makes sure that each cord pulls its full share of the load so that the belt has efficient pull and strength under diverse conditions.*

United States Rubber Company has the largest assortment of V-Belt molds in the world. If you want a "special" in a hurry, chances are it can be obtained without making a new mold. Moreover, to handle specific and special conditions, not usually encountered, these belts can be had with special properties. Order from your jobber, or for more information write to address below.

MULTIPLE V-BELTS
F. H. P. BELTS • FAN BELTS
FARM IMPLEMENT BELTS
SPECIAL PURPOSE BELTS

PRODUCTS OF
U.S.RUBBER
SERVING THROUGH SCIENCE

UNITED STATES RUBBER COMPANY
MECHANICAL GOODS DIVISION • ROCKEFELLER CENTER, NEW YORK 20, N. Y.

"BEST LOOKING ASPHALT TILE FLOORS WE'VE EVER HAD!"
Seeger Refrigerator Co., St. Paul... World's Largest Exclusive Refrigerator Manufacturer

"With only ⅓ the time... ½ the material cost!"

"Now we have the safest, best-looking floors we ever had . . . yet we cut maintenance time 65% and material cost 50% by using Multi-Clean Asphalt Tile Preserver and the Multi-Clean Method," says the Seeger Maintenance Director.

Over 20,000 sq. ft. of new and old asphalt tile in offices, plant hospital and cafeteria are now given this one simple treatment . . . only four times a year. Waxing applications—formerly needed 2 or 3 times monthly—*are no longer necessary!* Yet the floors retain a long-lasting, non-slip, glossy finish even under heavy traffic . . . and Multi-Clean Asphalt Tile Preserver has actually restored the original color to old, worn tile!

Maintenance is economical because ordinary damp mopping keeps the floors clean . . . and occasional steel wooling with a Multi-Clean Floor Machine keeps the surface bright and lustrous.

Find out what Multi-Clean Asphalt Tile Preserver will do for *your* floors. Mail the coupon for the complete story . . . no obligation, of course.

THE MULTI-CLEAN METHOD WILL REDUCE YOUR LABOR COSTS

The floor treatment used at Seeger's is only one application of the Multi-Clean Method. This is a proven three-way program for *all* types of floors. It includes (1) right materials for your floors (2) floor machines to reduce the labor and (3) detailed instructions for their proper use under various conditions in various industries.

EVERY MULTI-CLEAN PRODUCT CARRIES A 100% GUARANTEE!

FREE! FLOOR MANUALS

Each for the proper care of a specific floor. Check the coupon for the floors in your plant.

MULTI-CLEAN® PRODUCTS, INC.

MULTI-CLEAN PRODUCTS, INC.
2277 Ford Parkway, Dept. FM-11, St. Paul 1, Minn.

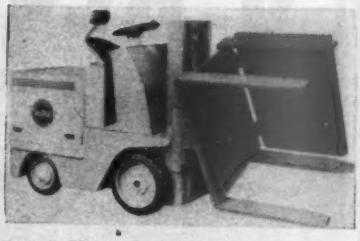
Please send me details on Asphalt Tile Preserver and the manuals I have checked.

☐ Asphalt Tile ☐ Concrete ☐ Rubber Tile
☐ Wood ☐ Terrazzo ☐ Linoleum
☐ Nine-Job Floor Machine ☐ Wet-Dry Vacuum ☐ All-Purpose Scrubber

NAME AND TITLE.....
COMPANY.....
ADDRESS.....
CITY.....ZONE...STATE.....

MATERIALS HANDLING EQUIPMENT

Begins on page 186



Fork Truck Attachment Inverts Palletized Loads

With this attachment you can invert a unit load without removing it from its pallet. The revolving head fits Baker 3000- and 4000-lb. fork lift trucks.

The attachment has two sets of forks. The bottom set picks up the pallet load to be inverted. The top set carries the pallet on which the load will rest after it has been inverted. The side retaining board keeps the load in place while it is being rotated.

The Baker-Raulang Co., 1250 W. 80th St., Cleveland 2, Ohio.

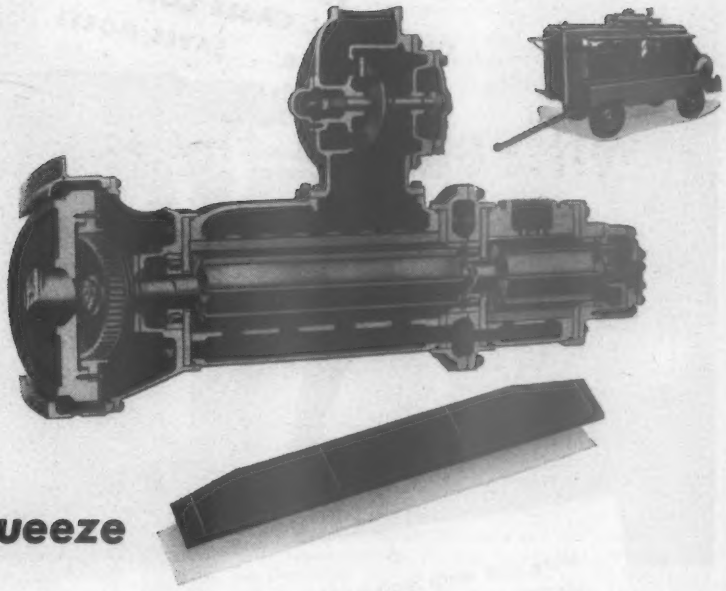
Fork Lift Trucks

The Towmotor people have expanded their line with five new fork lift trucks. For operation over rough surfaces, indoors or out, there are two new models with pneumatic tires. Model 480-P has a 48-in. wheelbase, a load capacity of 4000 pounds at 24-in. load center. Model 400-P has a 40-in. wheelbase, and a capacity of 2000 pounds at 24-in. load center.

The three other models have been redesigned with a shorter wheelbase for added maneuverability. Model 390 has a 39-in. wheelbase, a capacity of 3000 pounds at 15 inches. Model 420, with a 42-in. wheelbase, will handle 4000 pounds at a 15-in. center. And Model 460 has a 46-in. wheelbase, a load capacity of 4000 pounds at a 24-in. load center.

Towmotor Corp., 1226 E. 152nd St., Cleveland 10.

Turn the page



How to put on the squeeze

In the illustration above you see vanes used in the new Ingersoll-Rand Gyro-Flow portable air compressors. These vanes do an unusual job. They are made from an unusual material—Synthane laminated plastic.

The vanes are inserted in slots in a rotor which is mounted off-center in a cylinder. As the rotor spins, centrifugal action forces the Synthane vanes against the inside of the cylinder to form chambers between the vanes. Because of the eccentric mounting, these chambers constantly change in dimension. As they enlarge, air is drawn through intake ports in the cylinder walls. As they contract, the air is forced under pressure through discharge ports.

The result is a steady flow of compressed air without pulsation or vibration. Because of the complete simplicity of the machine, the compressor is lighter, more efficient, more economical to operate than conventional compressors.

It is apparent that the vanes are important components. They must be strong, light in weight, unaffected by the oils used to lubricate and form an air-tight seal between the vanes and the cylinder walls. They must be hard and dense to stand up under continuous operation yet not so hard as to score the walls of the cylinder.

Synthane has all of these properties and many more. In fact, it has so many useful mechanical, electrical and chemical characteristics that it cannot be adequately described in less than a complete catalog. If you have need for such material, a catalog containing a complete description of Synthane may be obtained by writing Synthane Corporation, 4 River Road, Oaks, Pennsylvania.

PLASTICS WHERE PLASTICS BELONG

SYNTHANE

Manufacturers of laminated plastics

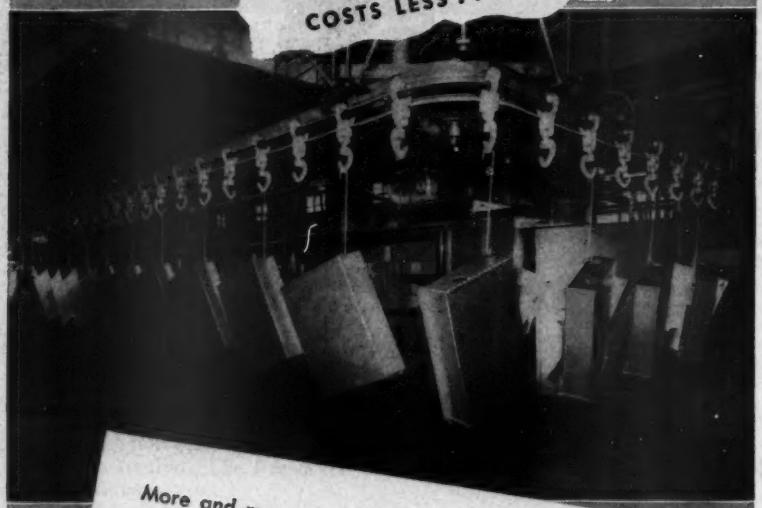
Don't be "CHAINED" to High-Cost Conveyors

FOR LIGHT AND MEDIUM LOADS

Buschman

UNIVERSAL CABLE CONVEYOR

COSTS LESS . . . SAVES MORE!



More and more mass production manufacturers are replacing chain type conveyors with low cost, light weight BUSCHMAN Universal Cable Conveyors. Standard sections, easily field installed, provide "custom-made" conveyors at "ready-made" prices.

In the plant of this Louisville, Kentucky manufacturer a Buschman Universal Cable Conveyor and an infra-red baking oven replaced a conventional batch type gas oven baking operation. Baking time was 30 minutes; now it's just 4½ minutes! Loading and unloading of batch type racks has been eliminated.

Write for Bulletin 400 or contact Buschman Representatives in principal cities.

PRODUCE MORE . . . FOR LESS on Buschman Conveyors

THE E. W. BUSCHMAN CO., INC.

4425 Clifton Ave.
Cincinnati 32, Ohio

MATERIALS HANDLING EQUIPMENT

Begins on page 186

Elevator Sill

This elevator sill can help your industrial trucks bridge the gap between your elevator and the floor of your building. It becomes an integral part of your elevator car, giving you sill protection on every floor where the elevator stops.

The Model E is equipped with two electric interlocks. When the sill is down, the elevator cannot move. When raised, the sill acts as a gate to keep trucks from rolling off while the car is in motion.

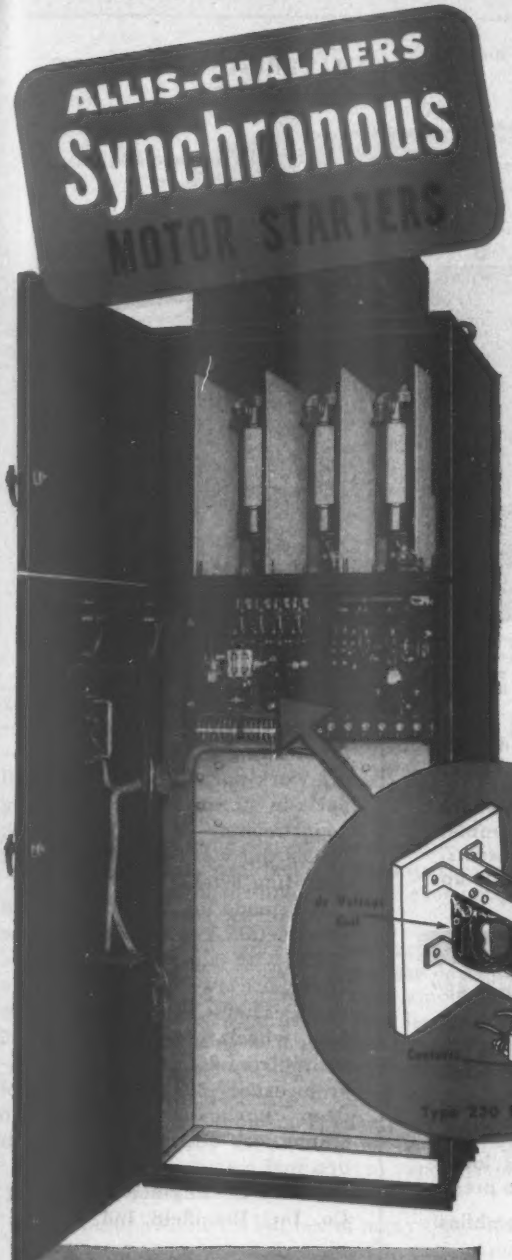
Alexander Sill Co., 970 Milwaukee Ave., Chicago 22.

•

SPECIAL CLAMP ATTACHMENT of Yale & Towne Mfg. Co., 11,000 Roosevelt Blvd., Philadelphia 15, permits its standard fork truck to tier crated and boxed products without pallets. Clamp will handle two 450-lb. crates at once. It can take two units up to 75 inches high and 36 inches wide each, and stack them 17 feet high.

SPUR-GEAR HOISTS in ½- and 1-ton capacities weigh only 39½ pounds. This unit weight includes standard length of coil chain for an 8-ft. lift. Housing and load-carrying parts are made of high-strength steel. For ease of maintenance, each unit can be rapidly disassembled with standard tools. Coffing Hoist Co., 800 Walter St., Danville, Ill.

Turn the page



Dependable..

A Smooth, Accurate Start

EVERY TIME!

YOU CAN DEPEND on Allis-Chalmers Synchronous Motor Starters for accurate and consistent field application . . . for complete line-to-load protection.

Heart of the Allis-Chalmers Synchronous Motor Starter is the Type 230 polarized field-frequency application relay. Simple and dependable, this single relay performs all these functions without the use of primary potential or current transformers:

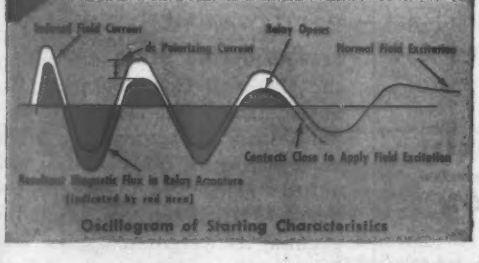
★ Applies dc excitation automatically when proper rotor speed is reached.

★ Selects exact half cycle and the most favorable angle between rotating field and revolving magnetic stator field to apply excitation.

★ If motor pulls out of step, it removes field excitation promptly at instant of pull-out.

★ Resynchronizes automatically after pull-out if condition has been corrected.

THIS IS HOW THE RELAY WORKS. The transformer action between the stator and the rotor of a synchronous motor (during acceleration) causes an alternating current to be induced in the field circuit of the rotor. A decrease in the magnitude and frequency of the induced rotor current as the motor accelerates, together with a biasing voltage from the excitation source, causes the Type 230 field application relay to apply field excitation at the most favorable point of stator-rotor relationship. The relay will maintain the field excitation during normal motor operation, but will operate to remove the excitation on motor pull-out. The relay will resynchronize the motor if the pull-out condition has been removed before protective devices operate to disconnect the motor from the line.



All Allis-Chalmers motor starters . . . those for synchronous, wound-rotor and squirrel-cage motors . . . give you everything you need for complete control and protection of your motors. The attractive, easy-to-install steel cubicles are compartmented to protect personnel — arranged for simplified maintenance. For more information, call your nearby A-C representative, or write Allis-Chalmers, Milwaukee 1, Wisconsin, for Bulletin 14B6410A.

A-3480

ALLIS-CHALMERS

There is an Allis-Chalmers Starter for Every Motor Need

1 TRUCK
speeds up all 3
WAREHOUSING
SHIPPING
PRODUCTION
RAYMOND

2,000 or 4,000 lb. Cap.

Platform-Type ELECTRIC TIERING TRUCK

Now you not only can speed up warehousing and shipping but production work too with this *RAYMOND* Electric Tiering Truck!

Why? Because this platform-type truck actually will go anywhere an ordinary hand truck will go. It's so compact, so maneuverable, it operates as easily in cramped production areas as in boxcars, trailers, elevators and narrow hand truck aisles. And it travels up to 3⅓ MPH loaded — 4 MPH empty.

BUT LET THESE RAYMOND FEATURES TELL THE STORY!

- **STACKS FROM 5-FT. AISLES** Right-angle tiers loads 48" x 48" from narrow hand truck aisles.
- **HIGHLY MANEUVERABLE** Has 200° turning radius — operates with ease in crowded areas, on low capacity floors and lofts.
- **MAKES ⅓ MORE SPACE** Reduces conventional tiering truck aisles 5 to 7 ft. Adds as much as ⅓ more storage space.
- **OPERATES IN PRODUCTION AREAS** Positions loads right at machine. Speeds transfer of dies from storage rack to press.
- **FAST, EASY MAINTENANCE** Major working assemblies can be quickly removed for fast, easy bench repair.

RAYMOND

Electric Industrial Trucks • Hydraulic Elevating Equipment

SEND FOR BULLETIN 710

. . . it gives you all the facts. And be sure to ask for a demonstration of the *RAYMOND* Platform-Type Tiering Truck!

The RAYMOND CORPORATION
Formerly LYON-Raymond Corporation
3257 Madison St., Greene, N. Y.
Gentlemen: Please send me Bulletin 710 on your Platform-Type Electric Tiering Truck. I am interested in a demonstration.
Yes ☐ No. ☐
Name ..... Title .....
Company .....
Street .....
City ..... State .....

MATERIALS HANDLING EQUIPMENT

Begins on page 186

Metal Stock Cart

Here's a stock cart for any number of plant handling jobs—for stocking assembly lines, moving work parts, or running small parts in storerooms and shipping departments. This floor truck places the work at a convenient operating level.

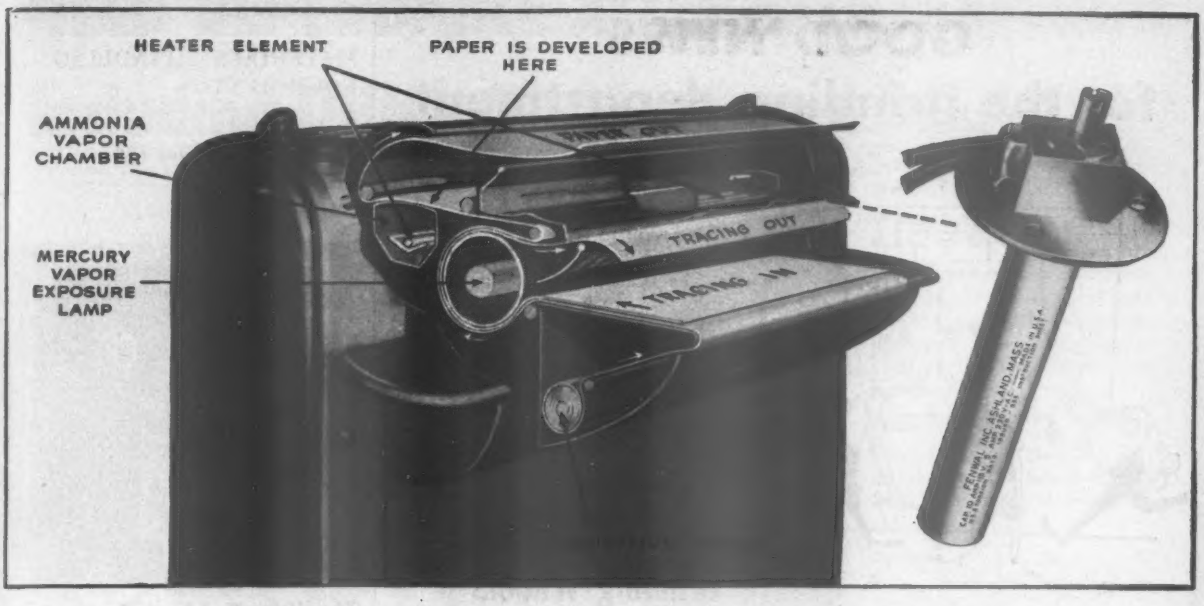
It's made of angle iron and sheetmetal. You can also get one model with expanded metal sides. There are two swivel and two rigid casters with either 4- or 5-in. wheels. Truck height is 35 inches from floor to top. Container measures 30x24 by 10 inches deep. Lower shelf attached to frame just above the casters is optional.

Industrial Engineering & Mfg. Co., Inc., Brimfield, Ind.

•

SELF-ADJUSTING SLING offered by the Caldwell Co., Rockford, Ill., automatically equalizes unbalanced loads. As the crane lifts, the sling legs turn on a sheave and adjust themselves to the proper lengths. When the load is off the ground, its weight locks the legs in place. Operator can also adjust sling to lift at any desired angle. The Adjust-A-Leg sling comes in eight sizes, ranging from 3/4- to 15-ton capacity.

Turn the page



Heat control problem in Ozalid reproduction machine solved

by Multi-Purpose Thermostat

When the Ozalid Streamliner reproduction machine was designed, a vital factor toward its successful performance was the maintenance of an even temperature within the developer tank.

After sensitive paper has been exposed, it is conveyed across the perforated top of the developer tank and developed by controlled aqua ammonia vapors. These vapors are superheated by a heater within the tank. Even heating at a specified temperature is imperative as, otherwise, uneven development results.

A low-cost THERMOSWITCH thermostat solves this heat control problem. It effectively maintains the vapor at a steady temperature for optimum developing conditions, by reacting both to vapor temperature and to radiant heat from the heater.

This application is but one of many types of control problems in which easy-to-install, easy-to-maintain Fenwal THERMOSWITCH thermostats have proved successful. Their activating control element is the single-metal shell that expands or contracts *instantaneously* with temperature changes, making or breaking the totally enclosed electrical contacts. Through this unique principle, THERMOSWITCH Units effectively control *many* variables where heat is a factor.

Find out now how Fenwal THERMOSWITCH Units can help you in *your* product. Mail coupon today.

Visit our Booth 603 at the CHEMICAL INDUSTRIES Exposition Grand Central Palace, New York

Fenwal

THERMOSWITCH

The Precision Multi-Purpose Thermostat Control

SENSITIVE . . . but only to heat

FREE! **Get this bulletin . . . see what Fenwal THERMOSWITCH units can do for you. *Just fill in coupon and mail . . . no obligation.***

FENWAL, INCORPORATED, 611 Pleasant St., Ashland, Mass.
111 South Burlington Ave., Los Angeles 4, Cal.
TEMPERATURE CONTROL ENGINEERS

Name ..... Position .....
Company .....
Street .....
City ..... Zone ..... State .....

I am chiefly interested in the applications checked:

- ☐ Heating
- ☐ Cooling
- ☐ Humidity Control or Detection
- ☐ Alarm (over-temperature, under-temperature)
- ☐ Vapor Level Control
- ☐ Timing (thermal)
- ☐ Radiant Heat Control
- ☐ Pressure Control (by controlling vapor temperature)

OTHER (Please fill in your special requirements) .....
.....
.....

GOOD NEWS
for the grinding department

Production up! That's the bulletin board's big news . . . good news that started when Simonds Abrasive Company wheels went to work in the grinding department. Simonds complete line includes wheels accurately specified for top results on every grinding job . . . accurately specified production tools made by Simonds Abrasive Company, a major grinding wheel manufacturer for almost 60 years. Why not talk over your grinding problem with a Simonds engineer? It costs nothing. Write.

SIMONDS ABRASIVE CO.
Grinding Wheels

EXECUTIVES — *Simonds Abrasive Company's complete line has everything you need . . . grinding wheels, mounted wheels and points, segments and abrasive grain.*

SIMONDS ABRASIVE CO., PHILADELPHIA 37, PA. BRANCH WAREHOUSES: CHICAGO, DETROIT, BOSTON
DISTRIBUTORS IN PRINCIPAL CITIES

Division of Simonds Saw and Steel Co., Fitchburg, Mass. Other Simonds Companies: Simonds Steel Mills, Lockport, N. Y., Simonds Canada Saw Co., Ltd., Montreal, Que. and Simonds Canada Abrasive Co., Ltd., Arvida, Que.

LISTEN CURLEY . . . THAT'S ONE EXTINGUISHER YA' DON'T HAVE TO WORRY ABOUT GETTING WET!

That's right! Ansul Dry Chemical Fire Extinguishers are Water-tight. Thousands of Ansul Extinguishers stand guard over difficult fire hazards in locations where the extinguisher cannot be protected from the weather.

For installations where extinguishers cannot be pampered with expensive shelters, water-tight construction is essential for dependable fire protection. That's one reason you see so many more Ansul Dry Chemical Fire Extinguishers in outdoor locations protecting all sorts of tough hazards associated with the petroleum industry.

Advt

SEE PAGE 306

MATERIALS HANDLING EQUIPMENT

Begins on page 186

Flexible Rubber Door

This rubber door will let your truck operators drive safely through a closed doorway. The Candor parts without shock when nudged by a hand or fork truck, then automatically closes when the vehicle has passed. Basically, it's a flexible rubber curtain suspended on a swinging steel frame.

The Candor people claim their door will put an end to damaged swinging doors. And do a better job of keeping cold drafts out of frequently used doorways.

Candor Engineering Co., P. O. Box 210, Montclair, N. J.

•

A CONCAVE ROLLER CONVEYOR for handling shells and similar cylindrical objects has been engineered by The Alvey-Ferguson Co., 75 Disney St., Cincinnati 9, Ohio. The curved rollers cradle the cylinder in the middle of the conveyor, eliminating the need for side guides. No side guides means easier movement of objects onto and off the conveyor.

TROLLEY WITH HYDRAULIC COUPLING provides smooth start-and-stop in spotting loads, says maker, Yale & Towne Mfg. Co., 11,000 Roosevelt Blvd., Philadelphia 15. Smooth operation of this motor-driven trolley is said to increase load and operator safety, lower hoist maintenance costs.

Turn the page

NEED DEPENDABLE ALTERNATE MATERIAL including QUICK TOOL-UP and DELIVERY?

OILITE CAN HELP YOU NOW

Oilite Finished Machine Parts — with NO Machining

Here's how:

Oilite finished machine parts provide dependable replacements for bronze, brass, aluminum, cast iron, steel, and plastics. Frequently, replacements are permanent.

Oilite Material

Many Oilite raw materials, i.e., metal powders, are produced from by-products, readily available.

Tooling

Using Oilite finished machine parts, you save

- Tooling programs
- Tool Design
- Machine Tools
- Jigs and Fixtures
- Cutting Tools
- Gages
- Floor Space
- Skilled Manhours

Amplex type tools are, by comparison, inexpensive. Tool and die making facilities are available.

Delivery

Making Amplex tools generally requires only days or weeks and no additional machines.

Case Histories

Under conditions like today's we were in quantity production within six (6) weeks or less compared to eighteen (18) months by other processing.

Service

Our engineering and research covers a period of more than twenty (20) years in the production of Oilite metal powder products.

Home office personnel is augmented by a large staff of field engineers located in principal cities of the United States and Canada.

AMPLEX MANUFACTURING COMPANY

Subsidiary of Chrysler Corporation

DETROIT 31, MICHIGAN

OILITE PRODUCTS

OILITE PRODUCTS INCLUDE heavy-duty, oil-cushion, self-lubricating, ferrous-base bearings; Oilite bronze* and other nonferrous* bearings; self-lubricating cored* and bar* stock; permanent filters; and friction units.

Field Engineers and Depots throughout U.S. and Canada

Quiet... Clean... Safe

Because they are quiet, clean and safe, battery industrial trucks can be used without restriction in virtually any department of the plant or warehouse including confined quarters as well as areas devoted to processing foods, pharmaceuticals and other products demanding utmost cleanliness. They can even be provided with spark-enclosed construction for operation in hazardous locations.

They use low-cost electric power for battery charging; and they use it with maximum economy, because they start instantly, yet consume no power during stops. With electric-motor drives and EDISON Nickel-Iron-Alkaline Storage Batteries, they have a minimum of wearing parts; are easy to maintain, are rarely out of service for repairs. With batteries exchanged at convenient intervals, they operate around the clock with the highest dependability and lowest overall operating costs.

EDISON batteries have these important features:

They are durable mechanically; grids, containers and other structural parts of the cells are of steel; the alkaline electrolyte is a preservative of steel.

They can be charged rapidly; gassing cannot dislodge the active materials.

They withstand temperature extremes; are free from freezing hazard; are easily ventilated for rapid cooling.

They are foolproof electrically; are not injured by short-circuiting, reverse charging or similar accidents.

They can stand idle indefinitely without injury. Merely discharge, short-circuit, and store in a clean, dry place.

They are simple and easy to maintain.

As a result of these features, they are the longest-lived of all storage batteries. In fact, they have such long life that they effect important economies in depreciation charges. And they are so trouble-free that they cut maintenance charges too. Send for bulletin *Modern Material Handling* for further details of the advantages of electric-motor drives and EDISON batteries. Edison Storage Battery Division of Thomas A. Edison, Incorporated, West Orange, N. J. Thomas A. Edison of Canada, Limited, Montreal.

You can always rely on

EDISON

Nickel-Iron-Alkaline Storage Batteries

MEASURING & CONTROL APPARATUS

Dynamic Balancer

Here's a machine for putting rotors, pulleys, flywheels, etc., in true dynamic balance. Driving mechanism of this unit is a counterbalanced arm containing a set of five V-belts. The belts are powered by a 5-hp. motor.

The operator brings the drive belts into contact with the equipment under test. When the desired speed is reached, the arm is raised, and equipment continues to rotate on ball-bearings.

While rotating, the shafts are marked with a pencil or crayon. Position of the high spots caused by unbalance indicates where balancing weights are needed.

The Wagner balancer can handle rotating equipment up to 48 inches in diameter, 80 inches long, weighing 4000 pounds. The machine itself weighs about 1600 pounds, takes up 54x96 inches.

Industrial Engineering Equipment Co., 122 E. Fourth St., Davenport.

Turn the page

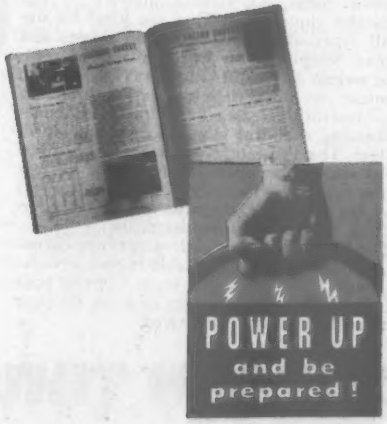
your plant is as OLD as its wiring system!

You can have the newest and best machinery money will buy; you may have the newest in modern plant design—but if your wiring system is obsolete you still have an old plant.

Fast-moving, full-scale production is being stymied in 9 out of every 10 industrial plants by overworked, obsolete wiring systems.

Now more than ever, you should be utilizing all the power you pay for. A dependable, up-to-date wiring system eliminates power breakdowns, lost man-hours . . . and adds strength to our national production.

Determine the condition of your plant wiring system today. Call in your utility, plant or consulting engineer or electrical contractor and arrange to have him survey your plant. And, most important of all, send for your free copy of *"Power Up—And Be Prepared."* This complete modern wiring guide shows you how efficient wiring systems cut down expenses and build up your power efficiency. Anaconda Wire & Cable Company, 25 Broadway, New York 4, N. Y. 51139



the right cable for the job

ANACONDA®

WIRE AND CABLE

ANNOUNCING...

another SURE STEP TO PROTECTION

NEW BUFFALO better-built

STAINLESS STEEL DRY CHEMICAL FIRE EXTINGUISHERS

The NEW, durable, extremely light weight Buffalo *stainless steel* dry chemical extinguishers give instant protection against gasoline, paint, oil, varnish, alcohol . . . all flammable liquid fires. They are ideal for use in all types of industries and on Busses and Trucks. Simplicity of operation and extreme light weight are featured in the NEW Buffalo *stainless steel* dry chemical extinguisher. In use, it instantly releases a heat-resistant, flame-suffocating, chemical cloud-like stream, up to 20 feet. The insulating effect of the chemical cloud allows the operator to get to the seat of the fire. The efficiency of Buffalo *stainless steel* dry chemical extinguishers exceed Underwriters' Laboratories requirements.

The NEW Buffalo *stainless steel* dry chemical extinguishers are available in two models: 20 pound; and 30 pound sizes. Consult your classified telephone directory or write for your nearest Buffalo representative.

- INSTANT FINGER TIP CONTROL
- LIGHT WEIGHT . . . EASY TO HANDLE
- STAINLESS STEEL CONSTRUCTION
- LONGER RANGE

Underwriters' Laboratories Approved

BUFFALO FIRE APPLIANCE CORPORATION

DAYTON 1, OHIO

NEW MEASURING & CONTROL APPARATUS

Begins on page 198

Air Scale for Process Weighing

You can use the F-C weight transmitter for either batch weighing or continuous process control. In either case it converts a variable force or weight into a readily measured pneumatic signal. Working through standard instruments, it will indicate, record, or control process weights.

Unit is said to be practically free from friction and lost motion. Maximum displacement, including overtravel, is 1/8 inch. Maker claims accuracy is limited only by the indicating instruments used with it. The scale balances out any tare weight.

The transmitter is completely enclosed, requires no electricity. So it's safe to use in explosive atmospheres. Capacities range up to 40 tons. The 5-ton model takes up less than a cubic foot.

Fluid Controls Co., Inc., 5150 Ridge Ave., Philadelphia 28.

Process Control Eliminates Hunting

The danger of over-correction and hunting in process controls is eliminated by the Fielden ARC-1 automatic control. This unit provides proportional, step-by-step regulation for industrial processes and machines. And also a continuous indication and record of the process variables under control.

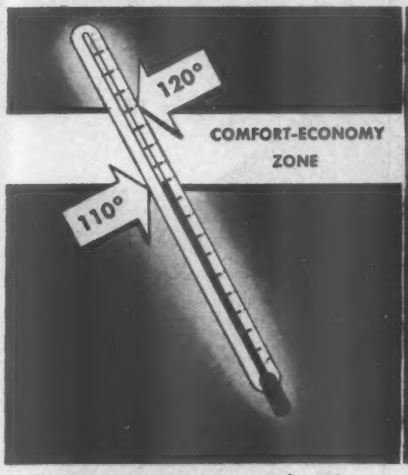
The Fielden unit automatically spots and corrects deviations in speeds, temperatures, pressures, etc., at time intervals automatically adjusted to suit machine or process speed.

Though unit is automatic, there are also pushbuttons for manual control. Pilot lights indicate whether variable is within limits and above or below control point.

Fielden Instrument Corp., 2920 N. Fourth St., Philadelphia 33.

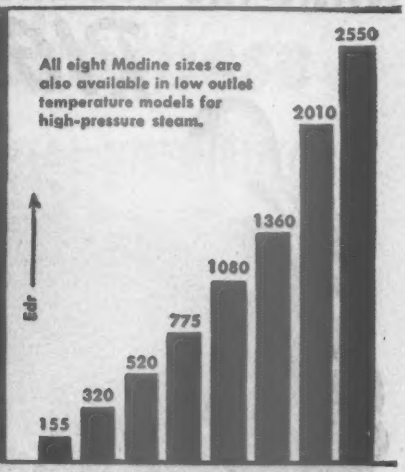
Turn the page

Three of many outstanding features that account for the Modine quality reputation



Discharge air temperatures of 110° to 120° F. are correctly related to air-velocities — assure perfect heating comfort plus lower fuel costs.

Versatile control of air delivery is provided by Cone-Jet, Truncone or Louvre deflectors. You can choose the *right* one for your job at no extra cost.



Big Modine Vertical Units for big defense plants eliminate expensive ductwork, retain the flexibility necessary for subsequent changes in plant layout.

COMPARE

..it all adds up to this..Modine is tops in unit heater values

U-1112A

Vertical delivery model shown here. Also available in Horizontal and Power-Throw types.

Advanced engineering . . . superb styling . . . highest grade materials and craftsmanship — all quality hallmarks of Modine Unit Heaters. They're your assurance of *heating performance at its best* — high fuel economy . . . years of trouble-free service. Built to a standard of excellence — Modine is the choice for unfailing dependability, lower operating and maintenance costs. So whether you need Vertical Delivery models (illustrated), Horizontals or Power-Throws — *compare first!* Modine Mfg. Co., 1505 Dekoven Ave., Racine, Wis.

Write for Bulletin 149-A, "Modine Unit Heating." Or contact your Modine representative listed in the classified section of your phone book.

Engineers rate Modine the standard of excellence

Modine UNIT HEATERS

WHEN THE JOB HAS GOT TO BE
RIGHT!

Snap-on*
TORQOMETERS
assure Precision Tensioning

It doesn't take a man one second longer to snug down a nut to exact tightness of factory specifications, with a Snap-on Torqometer. Sturdy, accurate Torqometers can easily pay for themselves by saving *just one critical assembling job* from "going bad" when it gets back in service. Even the most skilled mechanics can't be expected to approximate specified bolt tension "by feel." But with Snap-on Torqometers, the exact tension can be applied with ease. Torqometers are available in 15 models, ranging from zero to 30 inch-pounds, up to 2000 foot-pounds torque capacity. Factory branch offices and warehouses in 41 important industrial centers. Write for special Industrial and big General Catalogs.

SNAP-ON TOOLS CORPORATION
INDUSTRIAL DIVISION
8044-K 28th Avenue, Kenosha, Wis.

*Snap-on is the trademark of Snap-on Tools Corporation

NEW MEASURING & CONTROL APPARATUS

Begins on page 198

Pneumatic Thread-Gager

The Keller people have a speedy inspection tool for checking threads in tapped holes. The unit is air-powered and uses standard taper-lock plug gages.

The tool works on the "go-or-no-go" principle. The operator just presses the tool against the work, and the air motor screws the "go" gages into the hole. A pull on the tool reverses the motor, backs the gage out.

When the threads being checked are imperfect, an adjustable friction-type clutch permits the gage to stop without stalling the motor. Adapters hold taper-lock gages with thread diameters from .510 to .825 inch. Tool weighs 34 ounces.

Keller Tool Co., Grand Haven, Mich.

•

SIMPLE HUMIDITY INDICATOR gives a direct dial reading of per cent relative humidity. You can mount it on the wall in stockroom, warehouse, or office—any place you want to keep an eye on humidity conditions. Large scale dial is easy to read, ranges from 0 to 100% humidity. Fee & Stemwedel, Inc., 2210 Wabansia Ave., Chicago 47.

A NEW FREQUENCY COUNTER is the first single-unit device capable of instantly measuring and indicating frequencies up to 10,000,000 cycles per second. No interpolation or mental arithmentic required, says the Hewlett-Packard Co., 395 Page Mill Rd., Palo Alto, Calif. Price: $2000 f.o.b. factory.

Turn the page

It's EXTRAS like these

that enable IMPERIAL DISTRIBUTORS to offer you tube fittings that speed your work

Here are a few of the many Imperial EXTRAS in quality that help you get tubing connection jobs done easier, faster and simpler. They're EXTRAS that improve tubing jobs and add to all-around convenience in tubing work. When a distributor handles IMPERIAL you can be sure he handles the *finest in tube fittings.*

FITTINGS ARE FORGED*

- Forged fittings have *Greater Strength and Toughness.*
- They stand up better under pressure, vibration and shock.
- Denser grain structure means no chance of seepage.
- Greater uniformity means quicker, easier assembly. *Elbow and Tee Bodies.

TUBING SIZE MARKED ON NUT

- Identifies fittings quickly . . . speeds and simplifies tubing jobs.
- Makes it much easier to find needed fittings in a hurry.
- Fittings are easier to sort and check.
- Teaches men to recognize fitting sizes.

LONG DRYSEAL PIPE THREADS

- A definite improvement in pipe threads.
- Longer on sizes ¼" and over.
- Provide extra assurance of tighter, stronger joints.
- Especially valuable in providing for additional takeup when reconnection is necessary.

Imperial Tubing Tools Save you time — do jobs better

Imperial Distributors offer you tools for virtually any tubing connection job — cutting, flaring, double flaring, bending, reaming, swedging and pinch-off of tubing. Tools for copper, brass, aluminum, Bundyweld, JIC and other steel tubing.

Ask for Catalog No. 350 and Tube Working Handbook No. 369

THE IMPERIAL BRASS MANUFACTURING COMPANY, 517 S. Racine Ave., Chicago 7, Ill.
In Canada: 33 Church St., Toronto, Ontario

IMPERIAL

See Your Industrial Supply House

Pioneers in Tube Fittings and Tube Working Tools

● First requirement of profitable production is good light. Proper illumination of every working area throughout your plant gives you fewer rejects, improved worker morale, lower accident rates.

Each Appleton Lighting Fixture is precision-designed to provide *good light*—the right light, without uncomfortable glare, troublesome contrast or shadow.

The complete line of Appleton Industrial Lighting equipment blankets the needs of both outdoor and indoor installations, including the highly specialized requirements of hazardous locations. For the fixtures you need —for assistance on any lighting problems, contact Appleton, leading electrical manufacturer for nearly half a century.

Industrialite

Twin-Highlite

Stocklite

APPLETON Industrial Lighting

EFU Explosion-Proof Fluorescent

Pat. No. 2,392,202

Sold Through Electrical Wholesalers

APPLETON ELECTRIC COMPANY

1715 Wellington Avenue • Chicago 13, Illinois

CONDUIT FITTINGS • LIGHTING EQUIPMENT • OUTLET AND SWITCH BOXES • EXPLOSION-PROOF FITTINGS • REELITES

Branch Offices and Resident Representatives in All Principal Markets

NEW MEASURING & CONTROL APPARATUS

Begins on page 198

Filling Scale for Bags, Drums

You can use the Thayer scale for filling bags or drums with up to 200 pounds of powdered chemicals, foodstuffs, or similar free-flowing bulk. The scale is automatic and weighs to an accuracy of 1/10 pound.

The operator clamps a bag in place, pulls a release handle, and the rest of the filling operation is automatic. The scale meters out a pre-set amount of material. And the bag is automatically released when filled. Up to 10 100-lb. bags can be filled per minute. Indicator lights show how the filling is progressing.

All parts of the feeder in contact with the material are stainless steel. The feeder-gate is self-cleaning. Caster mounting permits the scale to be moved to the job.

Thayer Scale & Engineering Corp., 494 E. Water St., Rockland, Mass.

•

A MINIATURIZED VERSION of its 4-tube electronic counter decade is available from Potter Instrument Co., Inc., 115 Cutter Mill Rd., Great Neck, N. Y. Compact unit is one-third smaller than the standard decade. Two models have counting rates of 30,000 and 130,000 counts per second. You can buy a counter decade separately or as part of counting and timing equipment.

BIN-LEVEL INDICATOR made by The Bin-Dicator Co., 13946-92 Kercheval, Detroit 15, is designed to be suspended from the top of the bin. You can mount it anywhere in the bin to get the most reliable level indication. You support the Bin-Dicator on any size pipe up to 2 inches. Then easily move it up or down to operate at any level. Maker recommends one for bins with materials that tend to build up on the walls.

Turn the page

Now, more than ever before...

YOU NEED THE PROTECTION OF

WIREBOUND BOXES and CRATES

Losses due to container failure have no place in an industrial economy facing material allocations and shortages. That's why you should investigate *Wirebounds* —which combine the strength of steel with thinner wood to bring you *better product protection at lower cost.* Three hundred graduate engineers of the Wirebound Institute have been technically trained to design tailor-made *Wirebounds* which assure damage-free product delivery. The value of this container engineering is clearly demonstrated in the following case histories. We will be glad to show you how these benefits apply to *your* product. Use the coupon below.

YOU CAN CUT DAMAGE CLAIMS LIKE THIS:

Upside-down loading of circuit re-closers caused breakage, leakage, sometimes irreparable damage in handling and transit. Since switching to Wirebounds, company reports damage claims have become "negligible."

Using Wirebounds designed to "float" 400 lb. precision engines, this manufacturer chalked up a record of 2000 shipments in fifteen months without a single instance of damage in transit due to container failure.

Flexible power saw [illegible] plus weight from 400 to [illegible] cut cruising time 30%. Damaged shocks and handles units from high breakage damage due to container failure has been completely eliminated.

choose your course of action...

Wirebound BOXES & CRATES

☐ Send me general information . . . complete descriptive book titled "What to Expect from Wirebounds."

☐ Send me specific information . . . tear sheets of case histories of packing products similar to mine.

☐ Give me direct action send an Institute trained sales engineer to show the advantages of Wirebound packing for my own product.

NAME _____ POSITION _____

FIRM _____

STREET AND NUMBER _____

CITY _____ ZONE _____ STATE _____

OUR PRODUCT IS _____ IT WEIGHS _____

Users names o[illegible]

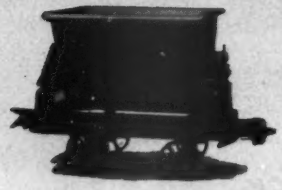
mail now to WIREBOUND BOX MANUFACTURERS ASSOC.
Room 1155—327 South LaSalle Street, Chicago 4, Illinois

Flexible to meet your requirements

Rugged to withstand years of hard service

EXCLUSIVE CASTOR ASSEMBLY
Improved plate type ball bearing castor. Forged steel fork held on by special king bolt with castellated nut adjustment. Correct castor lead. Wheel roller bearing mounted.
REAR AXLE BRACKETS
Steel brackets welded to frame. Flat stock saddle support for inner sills.
FLOOR BOARDS
Full 1" thick dressed hardwood crosswise within frame flanges. Wood bevel strip or optional flush metal hold down each side.
SAFETY SELF-COUPLER
Safe, quick-acting, efficient. Other types available if desired.
ALL STEEL FRAME
Arc welded assembly. Not a single nail, bolt or wood screw in the entire assembly.
WHEELS
Molded-on solid rubber tired. Cast steel type optional.

MERCURY A-310 CASTOR STEER TRAILERS



Type "A-370" with steel dump body

Type "A-310" with corrugated steel box body

Standardized in design...proved in service...flexible to meet your requirements. Fabricated and assembled in the largest and most completely equipped industrial trailer plant — the MERCURY A-310 castor steer trailer is constructed from standardized material, by standardized processes, *but* flexible in size, deck construction, hitch detail, wheel type, etc., to meet the particular demands of your operations.

For complete description and specifications of the MERCURY A-310 Trailer as well as Mercury special type trailers request Bulletins 160 and A-999.

THE MERCURY MANUFACTURING COMPANY
4110 S. Halsted Street, Chicago 9, Illinois

WHAT'S NEW IN EQUIPMENT

Begins on page 154

PAINTS & PROTECTIVE COATINGS

Spray Gun Coupling Gives Fast Color Change

A quick twist and a spray gun can be switched from one color to another without fuss or tools. You can do it with the new fluid hose connector developed for the DeVilbiss spray gun.

This durable aluminum coupling contains a spring-type ball valve set against a synthetic rubber seal. When the connector is locked in place the valve is opened for use. If you want to change colors, you just disconnect one line, connect in another.

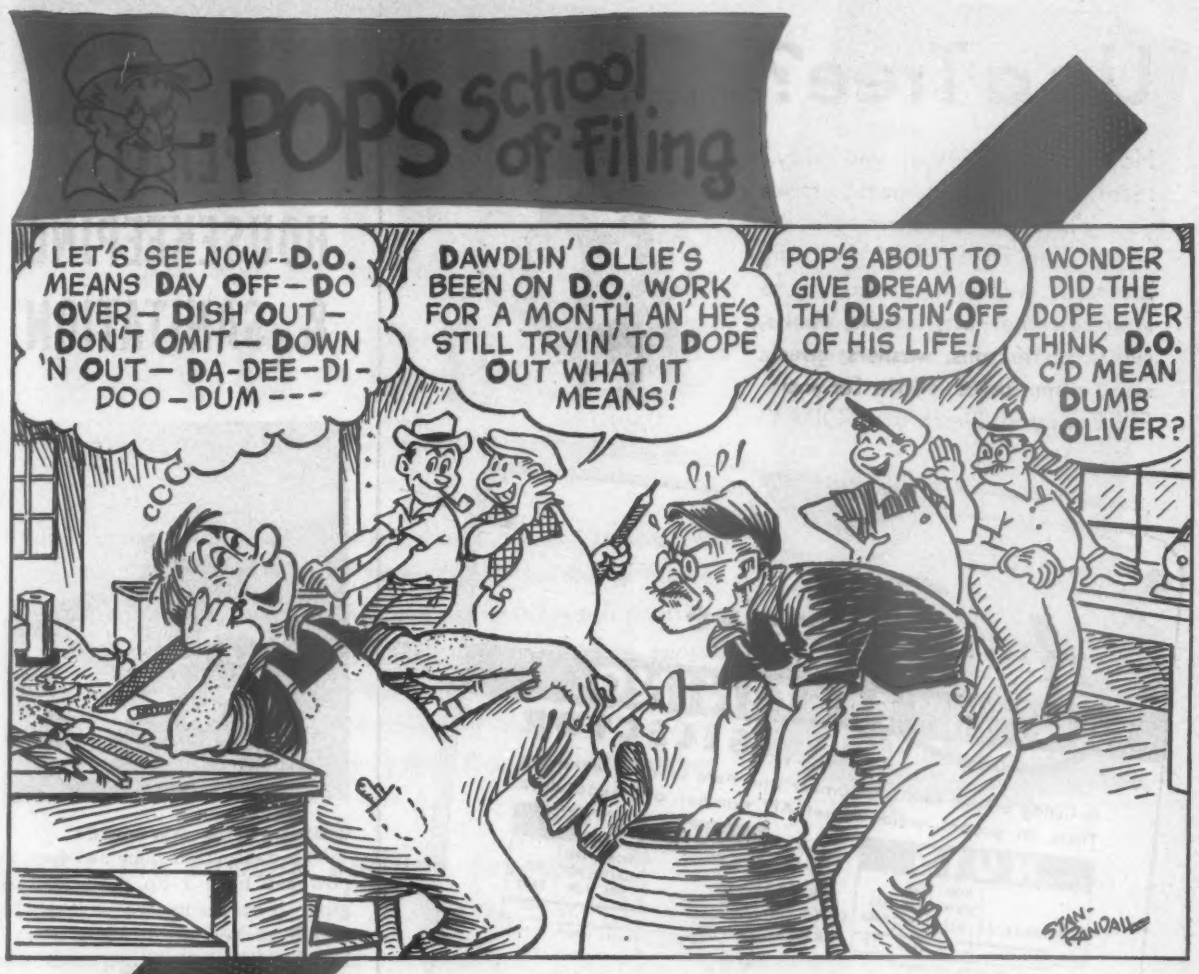
Valve and seal are leakproof and impervious to paint, solvents, other spray materials.

DeVilbiss Co., 300 Phillips Ave., Toledo, Ohio.

•

STAIZE-CLENE PAINT stays cleaner, according to the Enterprise Paint Mfg. Co., 2841 S. Ashland Ave., Chicago, because dirt and grime can't penetrate into the pores of the paint film. Maker claims it washes faster, too.

Turn the page


POP'S school of Filing
LET'S SEE NOW--D.O. MEANS DAY OFF—DO OVER—DISH OUT—DON'T OMIT—DOWN 'N OUT—DA-DEE-DI-DOO—DUM---
DAWDLIN' OLLIE'S BEEN ON D.O. WORK FOR A MONTH AN' HE'S STILL TRYIN' TO DOPE OUT WHAT IT MEANS!
POP'S ABOUT TO GIVE DREAM OIL TH' DUSTIN' OFF OF HIS LIFE!
WONDER DID THE DOPE EVER THINK D.O. C'D MEAN DUMB OLIVER?
STAN RANDALL

Of course, only a cluck of Oliver's cranial capacity would fail to understand that D.O. means Defense Order . . . and that Uncle Sam wants no antiquated methods or low-grade tools slowing up *his* vital production jobs. Nor do industrial managements themselves.

Take filing operations. They represent production and assembly processes where poor results and untold man-hour losses can be incurred through the use of quick-dulling files of low-quality steel, haphazard cut and unscientific hardening.

Nicholson testing laboratories have proved this over and over — in unbiased comparisons that make the difference in file costs a mere "drop in the bucket" compared to the cost of labor wasted with poor files.

Nicholson and Black Diamond files definitely stay sharp longer—thereby removing stock faster and longer. That's not surprising, of course, since Nicholson has been making files for more than 80 years. Nevertheless, our engineers continue to discover new things about their manufacture year after year.

• • •

Sold through industrial distributors under the Nicholson policy of TWELVE PERFECT FILES IN EVERY DOZEN.

• • • •

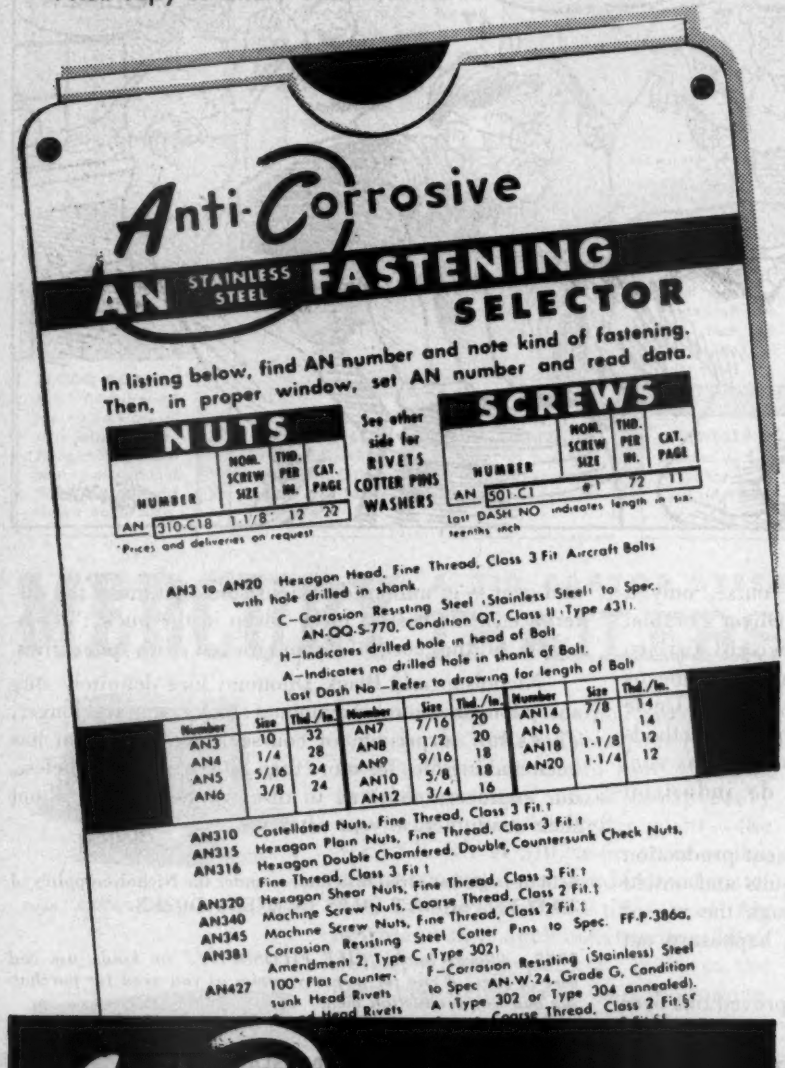
FREE — *48-page book, "FILE FILOSOPHY," on kinds, use and care of files. Write for as many copies as you need for purchasing and key production men.*

NICHOLSON FILE CO. • 27 ACORN STREET • PROVIDENCE 1, RHODE ISLAND
(In Canada, Port Hope, Ont.)

NICHOLSON FILES FOR EVERY PURPOSE

Up a Tree?

Not enough hours in your day? Here's a handy slide-chart to make your job simpler and save valuable time! This FREE chart instantly identifies A-N Nos. pertaining to stainless steel nuts, screws, bolts, rivets, cotter pins, washers; gives sizes, other data. Write for your FREE copy of Chart 51J TODAY!


Anti-Corrosive
AN STAINLESS STEEL FASTENING SELECTOR
In listing below, find AN number and note kind of fastening. Then, in proper window, set AN number and read data.
NUTS
NUMBER
NOM. SCREW SIZE
THD. PER IN.
CAT. PAGE
AN 310-C18 1 1/8 12 22
*Prices and deliveries on request
See other side for RIVETS COTTER PINS WASHERS
SCREWS
NUMBER
NOM. SCREW SIZE
THD. PER IN.
CAT. PAGE
AN 501-C1 #1 72 11
Last DASH NO indicates length in sixteenths inch
AN3 to AN20 Hexagon Head, Fine Thread, Class 3 Fit Aircraft Bolts with hole drilled in shank
C—Corrosion Resisting Steel (Stainless Steel) to Spec. AN-QQ-S-770, Condition QT, Class II (Type 431).
H—Indicates drilled hole in head of Bolt
A—Indicates no drilled hole in shank of Bolt
Last Dash No—Refer to drawing for length of Bolt
Number Size Thd./In. Number Size Thd./In. Number Size Thd./In.
AN3 10 32 AN7 7/16 20 AN14 7/8 14
AN4 1/4 28 AN8 1/2 20 AN16 1 14
AN5 5/16 24 AN9 9/16 18 AN18 1-1/8 12
AN6 3/8 24 AN10 5/8 18 AN20 1-1/4 12
AN12 3/4 16
AN310 Castellated Nuts, Fine Thread, Class 3 Fit.†
AN315 Hexagon Plain Nuts, Fine Thread, Class 3 Fit.†
AN316 Hexagon Double Chamfered, Double Countersunk Check Nuts, Fine Thread, Class 3 Fit.†
AN320 Hexagon Shear Nuts, Fine Thread, Class 3 Fit.†
AN340 Machine Screw Nuts, Coarse Thread, Class 2 Fit.†
AN345 Machine Screw Nuts, Fine Thread, Class 2 Fit.†
AN381 Corrosion Resisting Steel Cotter Pins to Spec. FF-P-386a, Amendment 2, Type C (Type 302)
AN427 100° Flat Countersunk Head Rivets F—Corrosion Resisting (Stainless) Steel to Spec AN-W-24, Grade G, Condition A (Type 302 or Type 304 annealed).

Anti-Corrosive Metal Products Co., Inc.

Manufacturers of STAINLESS STEEL FASTENINGS

CASTLETON ON HUDSON NEW YORK

PLANT HOUSEKEEPING & SANITATION

Gas-Engine Sweeper

This motorized floor sweeper is powered by a 1-hp., 4-cycle engine. It comes in two widths—20 and 28 inches. Addition of a wall brush (as shown) increases the sweeping width 6 inches.

You empty this unit by lifting out a light-weight hopper and dumping the contents. There's one all-purpose brush for general sweeping. You can also get special brushes for tile and polished floors, and for extra-rough surfaces.

Parker Sweeper Co., Springfield, Ohio.

•

ANTISEPTIC WALL WASH, called Fungitox, kills existing mold or mildew, then provides a colorless residual film that stops further growth. Fungitox has an agreeable odor, does not discolor painted surfaces, is not irritating to the user. You can brush or sponge it onto almost any type of wall surface, according to the Fungitrol Chemicals, Inc., Hillside, N. J.

Turn the page

3 months old and making safety switch history!

BULLDOG VACU-BREAK MASTER SAFETY SWITCH

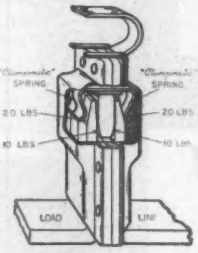
Switch users hail BullDog safety switch simplification program. Now, one great line of 38 BullDog Vacu-Break Master Switches fills all safety switch requirements! Type A switches . . . at C prices . . . possible only by concentrating switch production on one sensible, simplified line. Just 38 switches . . . instead of hundreds . . . to save you time, money, effort whenever you order, use, stock Type A, C or D safety switches.

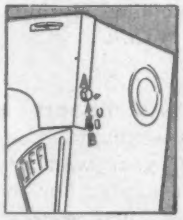
A Type A Switch at Type C prices!

All the famous BullDog features

EXCLUSIVE CLAMPMATIC CONTACTS!

"Clampmatic" is a method for obtaining extra and enduring contact pressure between switch jaws and blades. In ordinary switches, jaws exert about 10 lbs. pressure on blade. In Vacu-Break Switches, the Clampmatic spring augments this with 20 lbs. pressure on both "line" and "load" sides of jaws. Thus, Clampmatic provides a total of 30 lbs. of contact pressure between both sides of blade and jaw for "bolt-tight" contact.

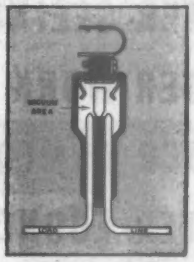




VOIDABLE COVER INTERLOCK!

Interlock: With interlock pin at Hole A, cover cannot be opened unless switch is OFF. Cover must be fully closed to throw switch ON.

To void interlock: Simply push interlock up and insert interlock pin in Hole B. Switch can then be thrown ON or OFF with cover open or closed.



EXCLUSIVE VACU-BREAK PRINCIPLE!

Dangerous arcs are quickly snuffed out by lack of oxygen in BullDog's exclusive Vacu-Break arcing chamber. This eliminates excessive arcing which, in ordinary switches, causes burning, pitting and rapid deterioration of contacts. Thus, the BullDog Vacu-Break chamber materially reduces switch maintenance.

including

- Quick-make and quick-break
- Anti-creepage corrugations on switch bases and arc chambers
- Solderless cable terminals (wire grips)
- Horsepower-rated
- Silver-surfaced current-carrying parts
- Spring-reinforced fuse grips
- Ample supply of concentric K.O.'s
- Generous wiring space in all switches

BULLDOG SCORES AGAIN!

Just 38 great Master Vacu-Break Switches replace hundreds of Type A, C and D safety switches.

WRITE DEPT. 453-B FOR DESCRIPTIVE FOLDER

BULLDOG ELECTRIC PRODUCTS COMPANY

DETROIT 32, MICHIGAN • FIELD OFFICES IN ALL PRINCIPAL CITIES

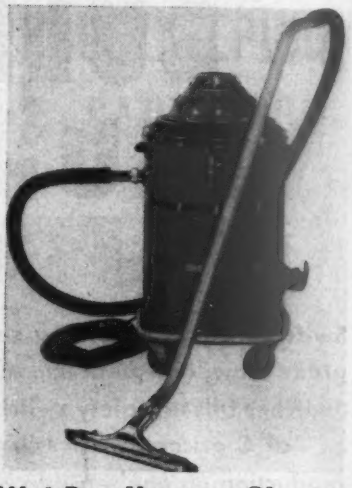
IN CANADA: BULLDOG ELECTRIC PRODUCTS OF CANADA, LTD., TORONTO

BULLDOG

THE LEADER IN FLEXIBLE ELECTRICAL DISTRIBUTION

PLANT HOUSEKEEPING EQUIPMENT

Begins on page 208



Wet-Dry Vacuum Cleaner

The Clarke Model WD-23 vacuum cleaner can be used for wet or dry pick-up. It has a 3-stage turbine powered by a 1-hp. universal-type motor. Water lift is 63 inches.

The 15-gal. tank of the WD-23 is lined with porcelain, inside and out, to prevent rust and corrosion. There's a special dump valve for quick draining. And a shut-off device that warns the operator when the tank is full. A protective, non-marking rubber bumper surrounds the base of the machine. Accessories include hose, wand, and various pick-up heads.

Clarke Sanding Machine Co., Muskegon, Mich.

•

DIANOL PAINTS INSECTS AWAY with one application. You mix Dianol with your wall or floor paints—then apply. For the life of the paint, Dianol stays on the job, dealing death and destruction to flying, crawling, chewing, and sucking insects. According to the Dianol Sales Corp., this "mix-with-paint" insecticide is odorless, non-toxic, does not change the color of the paint. You can mix it with just about any kind of paint.

Turn the page

13,440 HOLES PER HOUR!

"SKIL PERFORMANCE COUNTS WITH US!

We've Used 18 SKIL Drills and 2 SKIL Drivers, Hour After Hour for Six Months with Never a Breakdown . . ."

says Harold Johnston of MASTERCRAFT INDUSTRIES, Rice Lake, Wisconsin

Mastercraft Industries is now working on a huge government order for oak floor racks to be placed in walk-in meat coolers. Because they are assembled with screws there was a huge drilling problem facing this manufacturer. Mastercraft licked this problem by building their own ingenious multiple drill press, hydraulically operated. This drill press can drill up to 13,440 holes per hour.

Harold Johnston, part owner of Mastercraft, says, "Without the dependable performance of SKIL Drills we could never have handled this job at a profit. We have already turned out thousands of these floor racks and we have drilled hundreds of thousands of holes with our dependable SKIL Drills. Certainly if anyone has ever job-proved SKIL Drills we have, with constant use during the last 6 months. And during this time we have not had one breakdown."

Assembled inexpensively from standard ¼" SKIL Drills, this unit performs all the functions of a costly multiple spindle machine. This is one of many instances where special production needs have been met at low cost by units built from SKIL Portable Tools.

Herb Johnston, part owner of Mastercraft, is here using the Model 304 SKIL Driver. He is driving Phillips head screws into this ¾" oak. SKIL Drivers save *hours* here!

SKIL DRILL—MODEL 47

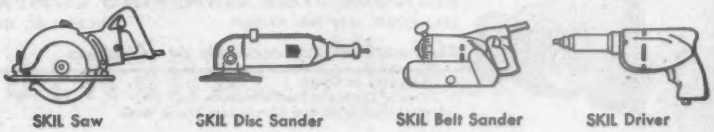
Model 47 is a compact, heavy duty ¼" drill. Capacity in steel: 0" to ¼"; in hardwood: 0" to ½". No-load speeds: 1800 r.p.m. standard. Overall length: 7¼". Weight: 3½ lbs. This is one of 26 SKIL Drill models. There's a drill for every requirement.

Call Your SKIL Distributor for Complete Information

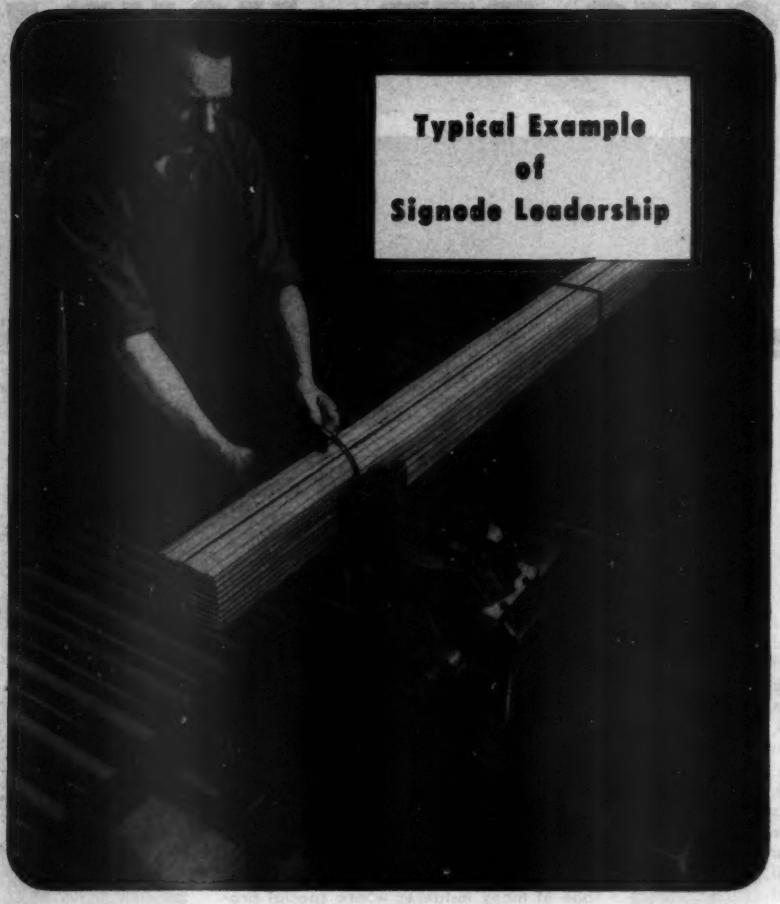
SKIL PORTABLE TOOLS

SKIL Products are made only by Skilsaw, Inc., 5033 Elston Avenue, Chicago 30, Illinois

Skilsaw Factory Branches in principal cities in Canada: Skiltools, Ltd., 3601 Dundas Street West, Toronto 9, Ontario



SKIL Saw | SKIL Disc Sander | SKIL Belt Sander | SKIL Driver



AUTOMATIC POWER STRAPPING!

If you have never seen a Signode Power Strapping Machine in action, this may seem hard to believe!

This mechanical device . . . with but the slightest guidance . . . draws steel strapping from a reel, loops it completely around a package or bundle, brings it to just the right tension, and then seals and severs the strap . . . at speeds up to 500 completed operations per hour . . . on such widely varying products as cartons of cigarettes and coils of wire.

Developed to meet the needs of mass production shippers, the Signode Power Strapping Machine, in one or another of its variations, has opened up a whole new avenue of profit possibilities for manufacturers of millwork, flooring, steel, canned food, plastic sheeting, automotive parts and scores of other products. It is one of the more recent, in a long list of contributions, which Signode has made to better packaging and shipping.

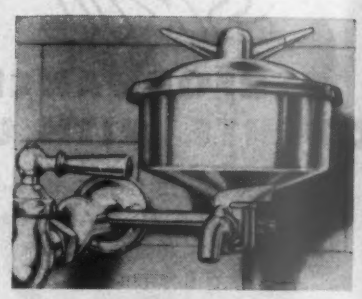
If you are engaged in defense or essential civilian production, we'd like to tell you more about Signode steel strapping, strapping tools and methods. Write . . .

SIGNODE STEEL STRAPPING COMPANY
2663 NORTH WESTERN AVENUE CHICAGO 47, ILLINOIS
this seal means security in shipping

Offices Coast to Coast
In Canada: Canadian Steel Strapping Co., Ltd.
Foreign Subsidiaries and Distributors World Wide

PLANT HOUSEKEEPING EQUIPMENT

Begins on page 208



Water Purifier

The Ogden purifier removes harmful bacteria, dirt, chlorine, and other "off" tastes from drinking water supply. You can install one right at the point of use. It takes little time, and no major plumbing changes to do it.

The unit is made of stainless steel. Maker says that the replaceable filter unit is good for thousands of gallons of water.

Ogden Filter Co., 4214 Santa Monica Blvd., Los Angeles 27.

•

SKIN-COTE HAND CLEANSER, when rubbed on the skin, turns to a liquid and literally melts dirt away, says The Boyer-Campbell Co., 6540 St. Antoine St., Detroit 2. This waterless cleaner will remove dirt, grime, paint, asphalt, many other industrial compounds. Dirt and cleanser can be wiped off with a paper towel or cloth.

BIGGEST STEAM CLEANER in captivity is the Power Master, says maker, Kelite Products, Inc., Box 2917 Terminal Annex, Los Angeles 54. The Power Master has two high-pressure steam guns, each delivering 150 gallons per hour. In addition, there's a high-pressure water gun supplying hot or cold water at 500 psi. pressure. This water gun delivers up to 1000 gph. for blasting away accumulations of muck or heavy grease, also for de-icing in the winter.

Turn the page

The best time to catch rejects

Of course inspection work needs good lighting. Yet all you can do at this stage is *catch* mistakes that have already been made.

. . . is before they happen

How much better to *prevent* errors in the first place—and the losses that go with them—with proper lighting at the *production* level! Yet this is where 60% of today's plants are underlighted.

Photos courtesy Thompson Products Co., Cleveland, Ohio

THE BEST WAY IS WITH "5-WAY IMPROVED" G-E FLUORESCENT LAMPS IN YOUR FIXTURES!

As a result of recent improvements made by General Electric lamp research scientists, you now get:

(1) Increased efficiency (improved phosphor)
(2) Better uniformity (improved processes)
(3) Less end blackening (purer materials, more accurate controls)
(4) Longer life (new materials and methods)
(5) Better color rendition (new Deluxe White lamps show colors as they really are)

Workers see better, work better under cool fluorescent light with less glare, fewer shadows. Newest form of fluorescent is G-E slimline—up to 8′ long, single pin base, instant starting.

Call your General Electric lamp supplier.

FREE BOOKLET! How to light up for better production. For your copy of "Planned Lighting for Industry," write General Electric, Department 166-F-11, Nela Park, Cleveland 12, Ohio.

You can put your confidence in—

GENERAL ELECTRIC

Specify Anchor Fence for plant PROTECTION that's more than surface deep!

Deep-driven anchors hold this fence PERMANENTLY erect in any weather, any soil!

ANCHOR CHAIN LINK FENCE gives your plant *really* permanent protection against trespassers, snoopers and troublemakers! Exclusive Deep-Driven Anchors, driven front and back, hold as strongly as tree roots . . . yet are easily removed at any time for relocation of fence. Anchor's H-Beam Line Posts are self-draining, rust-resistant, rigid. Square frame gates resist warping or sagging. Attractive Square Terminal Posts provide extra strength and durability.

Call a trained Anchor Fence engineer to discuss your needs—or write for free catalog to ANCHOR POST PRODUCTS, INC., *Industrial Fence Div.*, 6620 Eastern Ave., Baltimore 24, Md.

Anchor Fence

Nation-wide Sales and Erecting Service

WHAT'S NEW IN EQUIPMENT

Begins on page 154

MISCELLANEOUS

Reducer Fitting

The Swagelock reducer fitting permits different sizes of tubing to be joined easily. The fitting consists of a body, two ferrules, and a nut. The two ferrules plus the threaded chuck inside the Swagelock nut clinch tight around the tubing wall to provide a leak-proof seal. You don't have to do any preparatory work on the tubing itself.

Swagelock reducers come in brass, aluminum, steel, stainless steel, and monel. Sizes range from ⅛ to ⅞ inch O.D. Maker says they'll hold heavy or thin wall tubing equally well.

Crawford Fitting Co., 884 E. 140th St., Cleveland 10.

Arctangent Graph Paper

Arctangent graph paper is a special tool for special engineering jobs. It permits the plotting of uninterrupted curves of data ranging from plus infinity through zero to minus infinity. In this coordinate system most asymptotic functions are roughly linear.

Typical uses are the plotting of reactance functions, radioactive decay curves, and heating and cooling charts. Available with single or double arctangent coordinates. Size 8½x11.

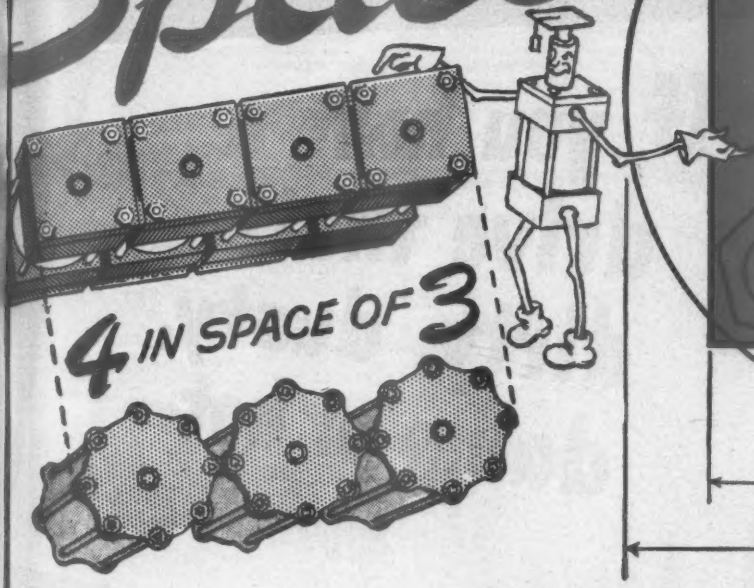
Orbid Electric Co., 2710 N. Menard St., Chicago 39.

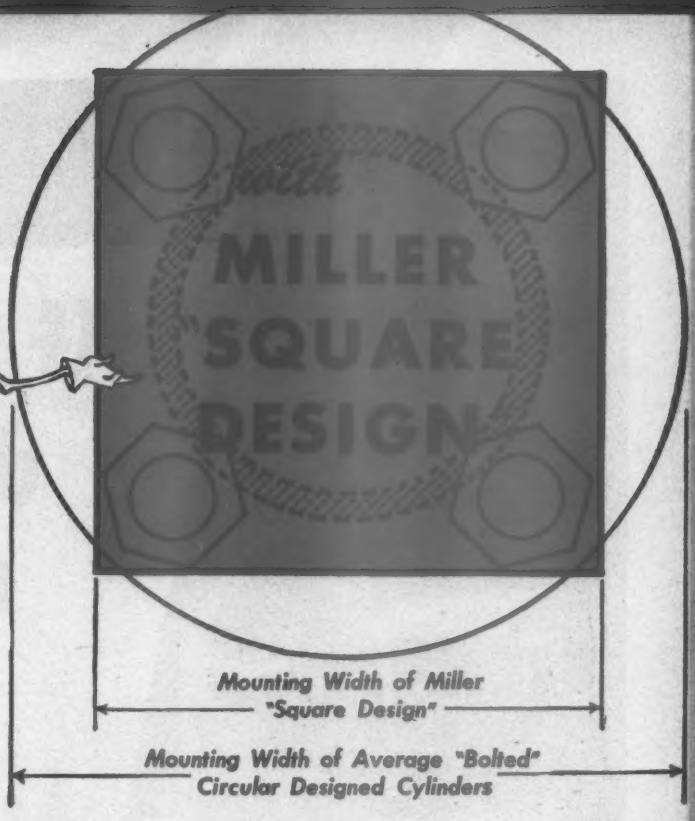
•

POCKET-SIZE STAPLER of The Heller Co., 2153-E Superior Ave., Cleveland 14, is a 1-hand gun for heavy-duty stapling. Maker says it packs five times the power of previous 1-hand industrial tackers. Oversize staples are designed for fastening shipping lists and identification tags securely to wooden crates and boxes.

Turn to page 366

Save Space





Air *and* Hydraulic CYLINDERS...

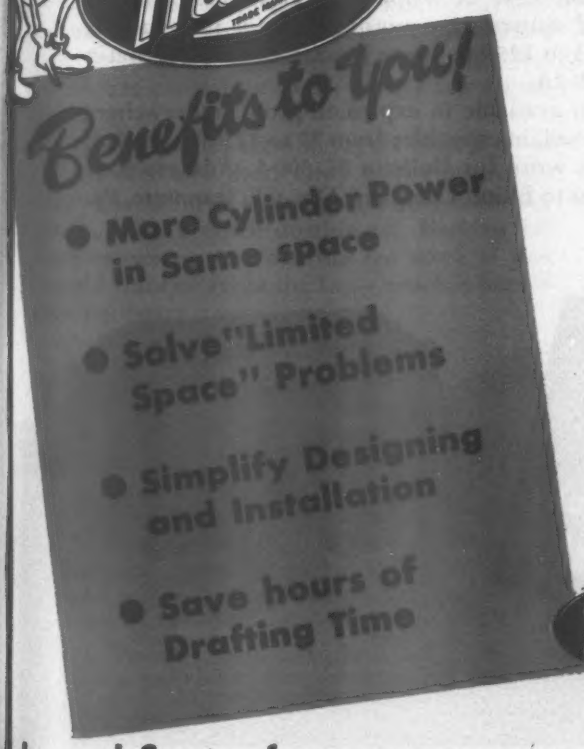
The SQUARE DESIGN of Miller Cylinders saves up to 25% of mounting space, permitting more cylinder power in the same space and easier, more convenient installation in "tight spots." Thus, in many cases, machines and equipment can be designed more compact and less costly by using Miller Cylinders. Hours of drafting time can be saved — as only a few straight lines show any view on drawings.

The illustration at upper left shows graphically how *four* Miller Cylinders can be mounted, bore for bore, in the same space required for *three* average "bolted" circular designed cylinders. Some Miller bore sizes permit even greater space-savings.

Other important *standard* features of all Miller Cylinders include: solid steel heads, caps and mountings, hard chrome plated piston rods, dirt wiper seals, and other "quality" features as shown in illustrated bulletins sent FREE on request. Remember, too, that Miller Hydraulic Cylinders (2000-3000 psi) meet the J. I. C. Hydraulic Standards.

Write for illustrated cylinder bulletins A-105 and H-104

COMPLETE MILLER CYLINDER LINE INCLUDES: AIR CYLINDERS, 1½" to 20" BORES, 200 PSI OPERATION; LO PRESSURE HYDRAULIC CYLINDERS, 1½" TO 6" BORES FOR 500 PSI OPERATION, 8" TO 14" BORES FO 250 PSI; HIGH PRESSURE HYDRAULIC CYLINDERS, 1½" TO 12" BORES 2000-3000 PSI OPERATION. A MOUNTING STYLES AVAILABLE.


Benefits to You!
• More Cylinder Power in Same space
• Solve "Limited Space" Problems
• Simplify Designing and Installation
• Save hours of Drafting Time

MILLER MOTOR COMPANY

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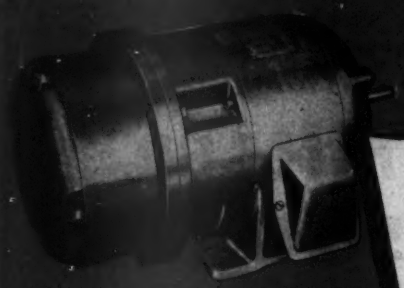
AIR AND HYDRAULIC CYLINDERS · ACCUMULATORS · COUNTERBALANCE CYLINDERS · BOOSTERS · AIR HOIS

CLEVELAND — PITTSBURGH — PHILADELPHIA — DETROIT — YOUNGSTOWN — BOSTON — HARTFORD — NEW YORK CITY — DAYTON — ST. PAUL — FORT WAYNE — INDIANAPOLIS — MILWAUKEE — NASHVILLE — SEATTLE — LOS ANGELES — SAN FRANCISCO — BALTIMORE — ST. LOUIS and OTHER AREAS.

les and Service from coast to coast



Brake motor using latest disk type brake mounted on BA drip-proof motor. Also available with totally enclosed and splash-proof enclosures for AC or DC applications.

Squirrel-cage splash-proof Form BA. Has corrosion-resistant covers which prevent entrance of splashing liquids.

Mill motor, W600 Series, DC. Conforms in all respects to AISE standards. Offers more power without an increase in the frame size.

If you have a drive that's dirty, dusty, damp or hot— here's the motor for it!

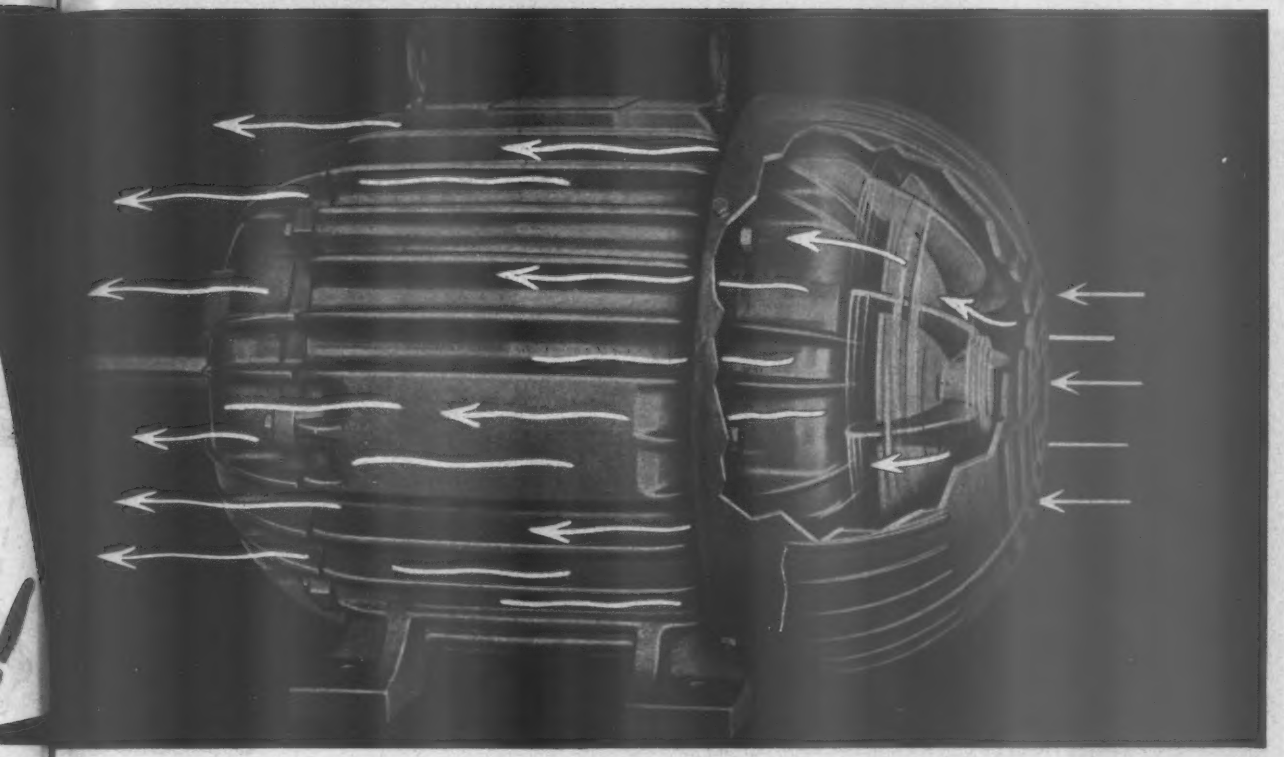
...the

Elliott C-W Sealedpower totally-enclosed fan-cooled squirrel-cage motors are made in capacities from 3 to 125 hp. Write for Sealedpower Bulletin SL-300-2A.

Also available in explosion-proof underwriters approved, in capacities from 20 to 125 hp. For full details write for Bulletin SL-300-5. Address your request to Elliott Company, Dpt. CE, Jeannette, Pa.

...with the ELLIOTT CROCKER-WHEELER complete motor line, you can meet 'most any integral motor need!

Wound-rotor protected type Form BW. For slow, smooth acceleration, high starting torque with low starting current, or variable speed. Drip-proof, splash-proof, 1 to 200 hp.



ELLIOTT CROCKER-WHEELER *Sealedpower* MOTOR

■ This motor is really sealed. There's no way in for dirt, dust, moisture or fumes. But there *is* an easy out for heat—by way of the many fins which are constantly swept by the fan-driven air blast.

That powerful, continuous air blast sweeps off all dirt and dust. Only under unusually dusty conditions is cleaning necessary, and then rarely, with a quick dusting off. Backing off four capscrews removes the fan cowl, if you *should* want to get at the fan—which is hardly ever necessary.

DURING THE PAST TEN YEARS thousands of these Sealedpower motors have gone into successful service. They were ahead of the field then, and they still are.

ELLIOTT COMPANY
Crocker-Wheeler Division
AMPERE, N. J.

BRANCH OFFICES AND REPRESENTATIVES IN PRINCIPAL CITIES
ELLIOTT *Approved* SERVICE SHOPS COVER THE COUNTRY
General Offices & Main Plant — Jeannette, Pa.

HALF CENTURY OF 1901 EC 1951 POWER PROGRESS

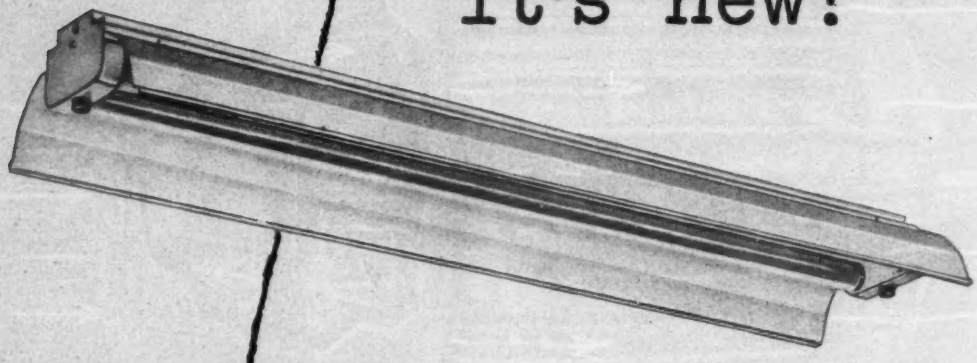
CW-88

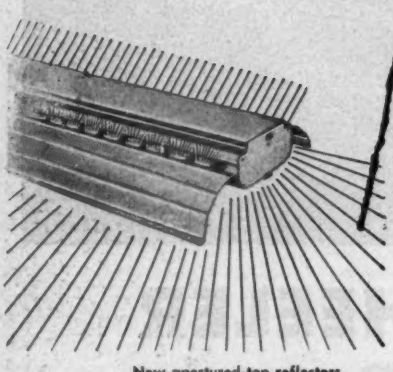
Squirrel-cage protected type Form BA. An open drip-proof motor for general purpose use. It is available in wide modifications to meet a variety of conditions.

DC drip-proof and drip-proof-protected types Form F, in ratings to 7½ hp, Form H, 10 to 200 hp.

Squirrel-cage, totally-enclosed, non-ventilated Form BE. Available up to and including 3 hp at 1800 rpm, for applications requiring protection against dust, fumes, moisture.

it's new!





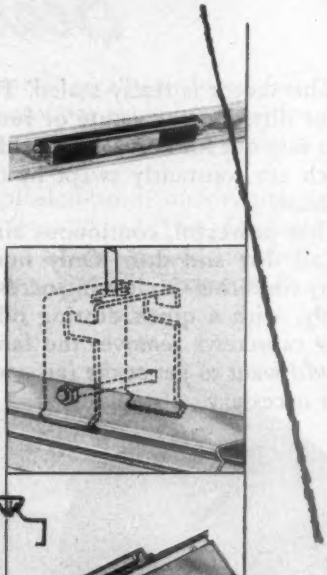
miller 50 FOOT CANDLER JR.

ONE fixture giving TWO-WAY light

New apertured-top reflectors, minimize brightness contrast — give sufficient up-light for overhead maintenance.

A distinct advance in industrial lighting. Good DOWN-light for overall lighting of industrial areas for maximum production efficiency. *Plus* UP-light through new apertured-top reflectors. More compact — uses new small cross-section ballast. Constructed with a minimum of critical material. Built on Miller's 8-Point QUALITY standard, for long dependable service, easy installation, and low maintenance. Can be installed individually or in continuous rows. Deliveries scheduled to the requirements of defense production.

Miller is one source of supply for QUALITY equipment for the best use of Fluorescent, Incandescent and Mercury lamps. Miller field engineers and distributors are conveniently located for nation-wide service. *Write or wire for complete details.*



New small cross-section G.E. #89G343 ballast — streamlined wireway.

Flanged-top wireway channel permits clamp hanger mounting anywhere along entire length — simplifies installation.

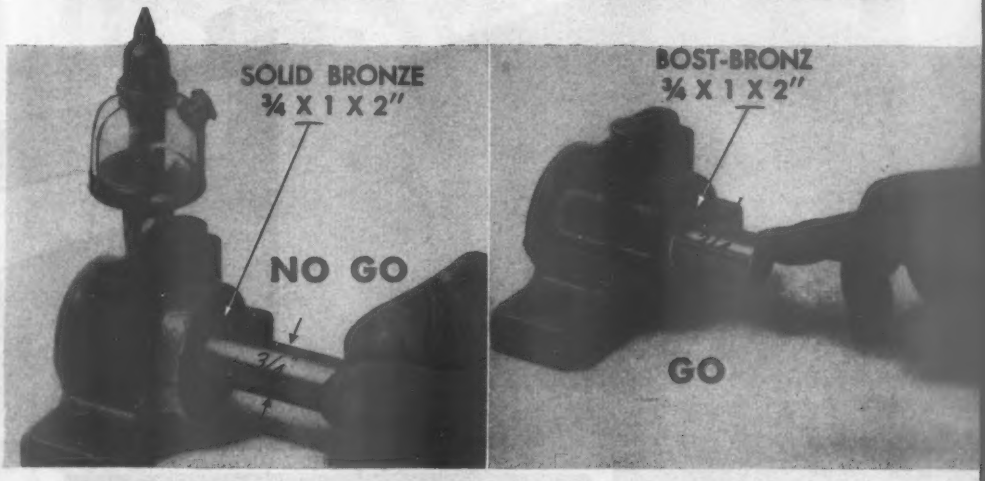
New pressure-type connector for joining luminaries for continuous rows. No holes to drill.

New all-white finish — baked enamel — RLM porcelain enamel.

THE miller COMPANY MERIDEN, CONN.
SINCE 1844

ILLUMINATING DIVISION: Fluorescent, Incandescent, Mercury Lighting Equipment
HEATING PRODUCTS DIVISION: Domestic Oil Burners and Liquid Fuel Devices
ROLLING MILL DIVISION: Phosphor Bronze and Brass in Sheets, Strips and Rolls

$3.32 SOLID BRONZE vs. SAME SIZE $.90 BOST-BRONZ®



COST OF BEARING	$ .87	COST OF BEARING	$ .90
REAMING	.70	REAMING NOT NECESSARY	.00
GROOVING	1.40	GROOVING NOT NECESSARY	.00
DRILLING	.35	DRILLING NOT NECESSARY	.00
COST OF MACHINING	2.45	COST OF MACHINING	.00
NO GO	$3.32	GO	$.90

1. BOST-BRONZ requires . . . . NO REAMING
   NO GROOVING
   NO DRILLING

2. BOST-BRONZ *gives better service* and *lasts longer*, whether loads are heavy or light, static or shock.

3. BOST-BRONZ is *cleaner* — no oil drip or waste, no openings for grit, lint or dirt.

IN STOCK 589 SIZES

Cylindrical Flanged } BEARINGS • BARS • PLATE

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BOSTON GEAR WORKS

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BOSTON Your STOCKS ARE Here

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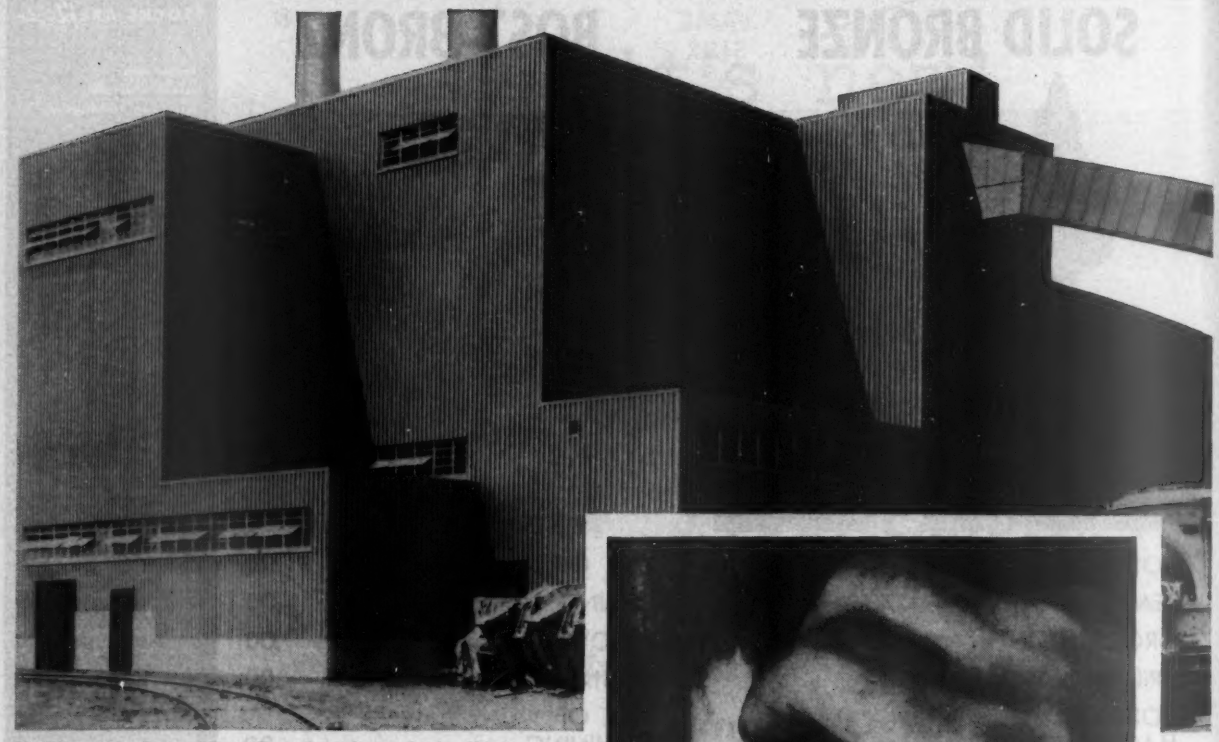
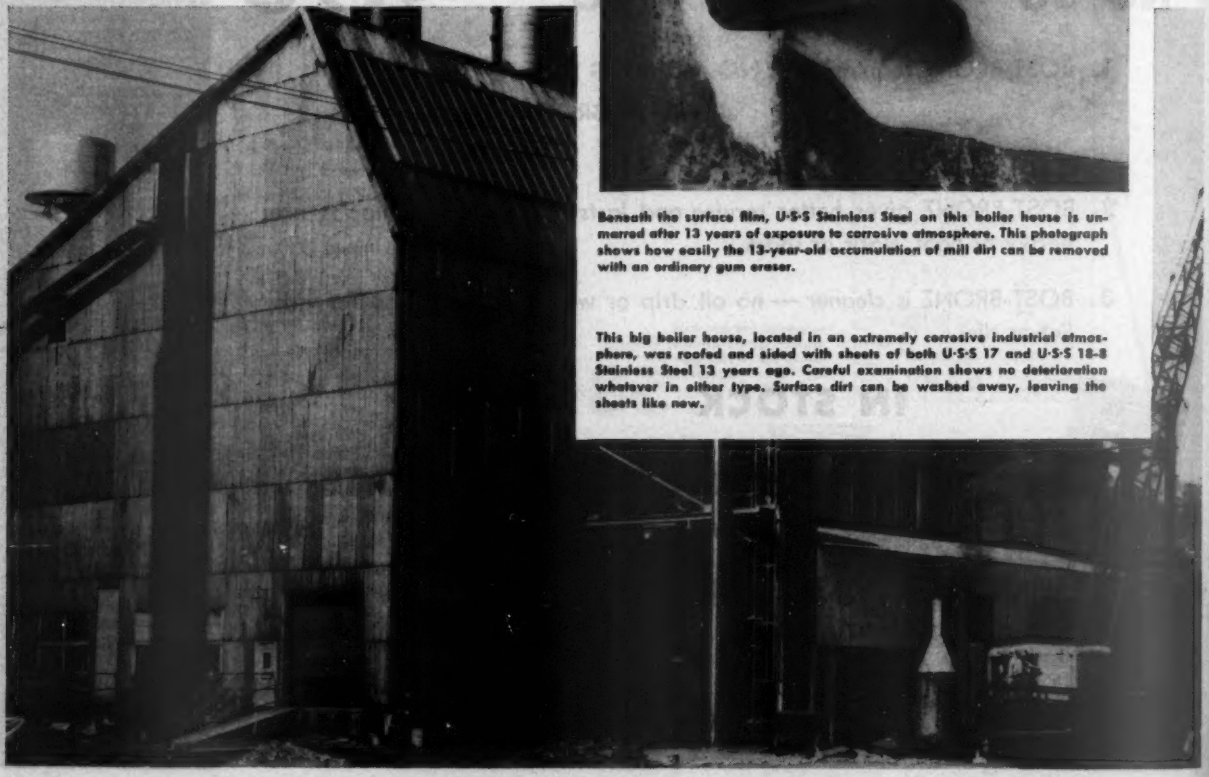
The most permanent walls and



The William J. Neal Station of Central Electric Power Cooperative, Inc., Voltaire, North Dakota, is built for long, maintenance-free service with 44,900 square feet of wall panels of Stainless Steel. Wall materials were fabricated and erected by the R. C. Mahon Company, Detroit. The building was designed by Vern E. Alden Company, Chicago.

Beneath the surface film, U·S·S Stainless Steel on this boiler house is unmarred after 13 years of exposure to corrosive atmosphere. This photograph shows how easily the 13-year-old accumulation of mill dirt can be removed with an ordinary gum eraser.



This big boiler house, located in an extremely corrosive industrial atmosphere, was roofed and sided with sheets of both U·S·S 17 and U·S·S 18-8 Stainless Steel 13 years ago. Careful examination shows no deterioration whatever in either type. Surface dirt can be washed away, leaving the sheets like new.

roofs for industrial plants

U·S·S Stainless Steel

AVAILABLE NOW!

● Because of its long life, U·S·S Stainless Steel can effect real savings for you in plant maintenance where savings really add up—in the roofs and exterior walls of all kinds of industrial structures.

And, most important of all today, grades of U·S·S Stainless Steel best suited for most wall and roof applications are *available now!* They are U·S·S 17 (Type 430) and U·S·S 12 (Type 410). You can take advantage of the long-range economy of Stainless Steel *today*.

Figured on a cost-per-year basis, Stainless costs far less than other metals. The original cost may be higher, but long life and minimum maintenance make the over-all cost of Stainless Steel far less. Compared with masonry walls, insulated walls of Stainless Steel are usually considerably cheaper, initially as well as in the long run.

In addition, the strength of Stainless Steel permits the use of lighter gages than is possible in other metals. This means reduction in dead load and thus permits the use of lighter structural sections. Lighter weight makes handling and erection easier and more economical, too.

Lower maintenance with Stainless Steel helps eliminate costly production interruptions during periods of replacement, repair and painting periodically required for other materials.

The grades of U·S·S Stainless Steel available now for industrial roofing and siding application have demonstrated their corrosion resistance and long life in many plant applications. They are perfected, service-tested materials that you can count on for unmatched performance and economy.

For additional information on U·S·S Stainless Steel for industrial walls and roofs, write for our new booklet. Use the handy coupon at the right.

United States Steel Corporation
Room 4304, 525 William Penn Place
Pittsburgh 30, Pa.

☐ Please send me your booklet "U·S·S Stainless Steel for Walls and Roofs of Industrial Buildings."

*☐ Please arrange to have your customers send me literature on their particular type of Stainless Steel roof and wall panels.

Name ..... Title .....

Address .....

City ..... State .....

*United States Steel is the producer of U·S·S Stainless Steel sheet and strip, not a maker of formed roof and wall panels. These are now being manufactured by a number of our customers.

AMERICAN STEEL & WIRE COMPANY, CLEVELAND · COLUMBIA STEEL COMPANY, SAN FRANCISCO
NATIONAL TUBE COMPANY, PITTSBURGH · TENNESSEE COAL, IRON & RAILROAD COMPANY, FAIRFIELD, ALA. · UNITED STATES STEEL COMPANY, PITTSBURGH
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USS

U·S·S STAINLESS STEEL

SHEETS · STRIP · PLATES · BARS · BILLETS · PIPE · TUBES · WIRE · SPECIAL SECTIONS

1-1690

UNITED STATES STEEL

SIGNIFICANT DEVELOPMENTS IN PRACTICAL LABOR RELATIONS

. . . told in brief for busy factory executives

By **PAUL A. KING**, *Assistant to Vice President for Personnel, Bigelow-Sanford Carpet Company, Inc. Member, New York Bar.*

COST OF LIVING INCREASES FOR WAGE EARNERS. *That's what new WSB Regulation 8 gives more of*.....**page 222**

BONUS STABILIZATION RULES ISSUED. *If you've been concerned about giving a Christmas bonus this year—or any other kind of bonus—this new regulation will indicate what you can do without specific WSB approval*.....**page 224**

N. J. CUTS OUT WASTE-MOTION JOB HUNTING. *One unemployment insurance farce is over in New Jersey. Workers needn't waste plants' time looking for work when they're only temporarily laid off*.....**page 226**

MODESTY DOESN'T ALWAYS PAY. *Here's a case where an overly modest woman employee was disciplined for her modesty*.....**page 226**

A NEW WAY TO CHECK JOB DISCRIMINATION. *Looks as if unemployment compensation agencies may be able to move in, if they want*.....**page 228**

NO TAX ON DISABILITY PAYMENTS. *Did you know workers retired because of disability don't have to pay tax on pensions?*.....**page 228**

HOW TO BE SURE YOU'RE EXEMPT FROM WALSH-HEALEY. *That's the public contracts law. The rule is simple: You're exempt only if the contract specifically says you are exempt*.....**page 230**

MENTALLY ILL EMPLOYEE ORDERED REHIRED. *Mental maladjustments are considered sickness by one arbitrator. A 3-month probationary period was provided, however*.....**page 230**

BRIEF—BUT IMPORTANT. *No social security or unemployment taxes on pay to men in armed forces . . .In new plant, wages must meet WSB standards, or else . . . No call-in pay for workers who fail to report address changes . . . WSB rules shouldn't limit arbitrator in granting wage raise, says arbitrator*....**page 232**

Cost of Living Increases for Wage Earners

If it's up to the Wage Stabilization Board, the wage earner's bread basket won't carry a lighter load as a result of the rising cost of living. WSB's new General Regulation No. 8 permits increases to catch up with cost-of-living rises.

Under the regulation (without board approval, generally speaking), you can do these things:

- You can pay a wage earner more money under a cost-of-living escalator clause in a contract in operation January 25, 1951.
- If you didn't have an escalator clause before that date, you can add one to your contract—if it provides for a "percent-for-percent" relationship between wage increases and decreases and the Bureau of Labor Statistics' consumer's price index (or some other acceptable index).
- Every six months you can grant a wage increase (without *any* escalator clause) to make up for loss of real wages because of the rising cost of living since the freeze date.

In connection with the second item above, the Board has already considered these as acceptable substitutes for the BLS consumers price index: the Consumers Price Index of the National Industrial Conference Board, the Massachusetts Retail Price Index of Specific Goods and Services, and the Honolulu Consumers Price Index.

Turn the page

Let's not clean away dollars and man-hours with costly, inadequate floor care

MECHANIZE *your floor-cleaning with a* COMBINATION SCRUBBER-VAC!

Wherever *combination-machine-scrubbing* is the practical solution to the floor-cleaning problem, any lesser, slower method is wasteful of money and manpower. A *Combination Scrubber-Vac* applies the cleanser, scrubs, rinses if required, and picks up (damp-dries the floor) — *all in one operation!* Maintenance men like the *four-in-one feature* . . . also the fact that the machine is simple to operate. It's *self-propelled*, and has a *positive* clutch. There are no switches to set for *fast* or *slow* — slight pressure of the hand on clutch lever adjusts speed to desired rate. The powerful vac performs efficiently and quietly. Cable reel is self-winding. Improved waterproof wiring and minimum electrical connections simplify the cleaning of the machine. *Model 213P Scrubber-Vac* at left, for heavy duty scrubbing of large-area floors, has a 26-inch brush spread, and cleans up to 8,750 sq. ft. per hour! (Powder dispenser is optional.)

***Finnell* makes *Scrubber-Vac Machines* in a full range of sizes — for small, vast, and intermediate operations. From this complete line, you can choose the size that's exactly right for *your* job (no need to *over-buy* or *under-buy*). It's also good to know that you can lease or purchase a *Scrubber-Vac*, and that *there's a Finnell man nearby* to help train your maintenance operators in the proper use of the machine . . . to recommend cleaning schedules for most effectual care . . . and to make periodic check-ups. For demonstration, consultation, or literature, phone or write nearest *Finnell Branch* or Finnell System, Inc., 2511 East St., Elkhart, Ind. Branch Offices in all principal cities of the United States and Canada.**

Conserve Manpower with Completely Mechanized Scrubbing

FINNELL SYSTEM, INC.

Originators of Power Scrubbing and Polishing Machines

FINNELL

BRANCHES IN ALL PRINCIPAL CITIES

FANS
any size you need—all
HEAVY-DUTY

We shipped the three big fellows shown above to a steel plant — installed in a large building containing gas engines generating electricity. The fans provide ventilation by diluting the escaping toxic gas fumes to such a low concentration that workers' health and comfort are no longer impaired. Each of these Clarage Type W Fans handles 150,000 cubic feet of fresh air per minute at 2" static pressure — each driven by a 100 HP motor *in continuous operation.*

300 to 4000 CFM

Or perhaps you need small fans — for ventilation, for removing excess heat, smoke, odors, or more special applications. Clarage Cast Iron Exhausters can be your economical answer to such requirements. Built with cast iron housings, they offer long resistance to corrosion. Many have seen more than 25 years of service — and still going strong!

When you buy Clarage air handling and conditioning equipment, you buy the best. *We don't go in for flimsy, light weight constructions.* Clarage equipment — from our smallest sizes to the largest fans we build — is HEAVY-DUTY to save you a great many dollars in the long run.

CLARAGE FAN COMPANY—*Kalamazoo, Michigan*

CLARAGE
—HEADQUARTERS for Air Handling and Conditioning Equipment

SEE OUR CATALOG IN SWEET'S

It pays to direct fan inquiries our way . . . phone Clarage office in your city, or write us at Kalamazoo.

Application Engineering Offices in All Principal Cities

PRACTICAL LABOR RELATIONS

Begins on page 222

Bonus Stabilization Rules Issued

Planning to give the usual Christmas bonus this year? A new Wage Stabilization Board Regulation says its OK without approval—*if* you automatically gave such bonuses in the past.

The same thing is true of other types of bonuses. For example, profit sharing bonuses—if they were *customarily* paid only once or twice a year. You must get approval for bonus payments that are figured more often than every three months, or are directly related to hours worked or units produced or sold by the employee.

You may also continue bonus payments made under an established plan — without WSB approval if they are made under a formula that has been set on a "precise and objective" basis. *But the plan must meet one of these three requirements:*

(1) In continuous operation since Jan. 25, 1949, or
(2) Covered by written union contract executed on or before Jan. 25, 1951, or
(3) Communicated in writing to employees on or before Jan. 25, 1951.

If the plan does not meet these requirements, the total amount or percentage of bonus given to any employee during any bonus year cannot exceed the amount or percentage of bonus paid to the employee during the preceding year.

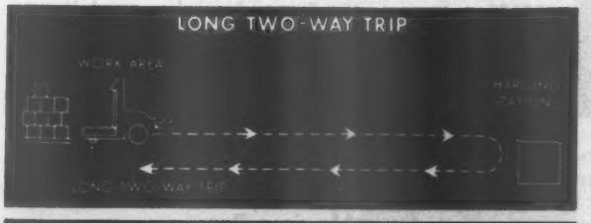
This is the gist of the regulation. Biggest problem is the interpretation of the alternative provisions. For the complete story, see the full WSB Regulation No. 14. But if you have any doubts about what you are permitted to do, check with your local Wage-Hour Division.

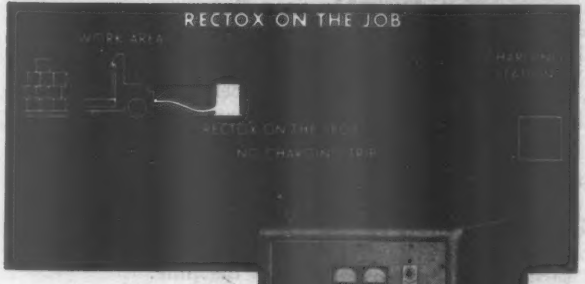
Turn the page

YOU CAN BE **SURE**.. IF IT'S

Westinghouse

"HEY! Is that trip necessary?"





Put Rectox® Chargers at strategic crossroads. Save trips to central charging stations. Valuable time is often consumed in returning trucks to central charging stations for recharging. This trip is not necessary. Place Westinghouse Rectox Industrial Truck Chargers at strategic locations throughout your plant and eliminate these long runs.

You can do it with Rectox. Anyone can operate them. They are completely automatic. Just plug them in any a-c outlet and forget them. In addition:

- ★ **One unit serves 80% of your applications.**
- ★ **No taps to change, charging cycle is completely automatic.**
- ★ **No energy wasting resistor. No moving parts.**

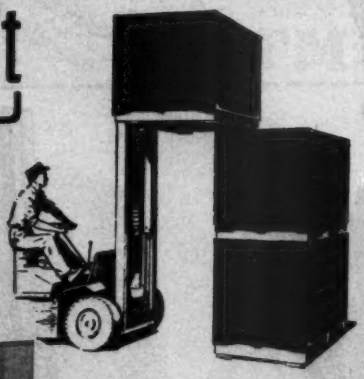
MORE DATA? **Ask your Westinghouse representative for a copy of DB-19-040 or write Westinghouse Electric Corporation, P. O. Box 868, Pittsburgh 30, Pa.**

J-21620

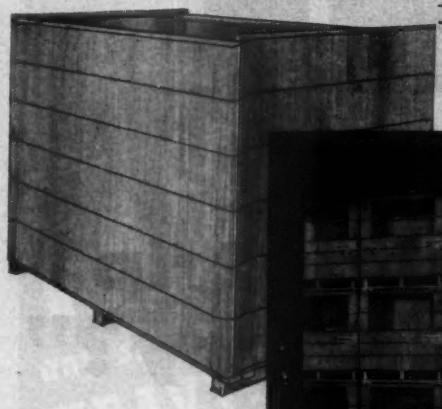
THIS ▶ OR THIS ▶

Generalift ★★★★★

pallet boxes



CUT MATERIALS HANDLING COSTS



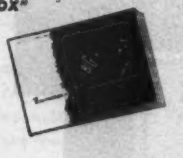
REDUCE STORAGE COSTS

• for large business
• for small business
• for ALL business

More and more manufacturers are helping solve their materials handling problems and storage problems with Generalift Pallet Boxes. It's the versatile container that sharply cuts costs . . . and helps step up production . . . because ONE workman, fork-lift truck, and Generalift Pallet Box do the work of many employees. Write us. We'll promptly provide full information on the Generalift Pallet Box, on ANY of our shipping containers.

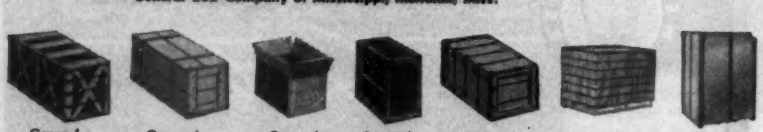
WE WILL MAIL FREE COPY OF "THE GENERAL BOX"

This colorful booklet illustrates and describes the many advantages of the Generalift Pallet Box. We will be glad to mail upon request.



General BOX COMPANY
engineered shipping containers
GENERAL OFFICES:
504 N. Dearborn St., Chicago 10, Ill.
DISTRICT OFFICES AND PLANTS:
Cincinnati, Dunville, N. J., Detroit, East St. Louis, Kansas City, Louisville, Milwaukee, Sheboygan, Winchendon,
Continental Box Company, Inc.: Houston, Dallas.
General Box Company of Mississippi, Meridian, Miss.

ALL TYPES OF ENGINEERED SHIPPING CONTAINERS



General Wirebound Crate | General Nailed Box | General Corrugated Box | General Cleated Corrugated Container | General All-Round Box | Generalift Pallet and Pallet Box | General Watkins-Type Box

PRACTICAL LABOR RELATIONS

Begins on page 222

N. J. Cuts Out Waste Motion in Job Hunting

New Jersey has come up with what seems like a sensible idea that will save personnel departments a lot of work.

Under the New Jersey unemployment compensation act, a worker is not entitled to benefits unless he is actually looking for work.

In the case of short layoffs, workers took up the time of other plants' personnel departments "looking for work"—which they wouldn't take. And the personnel departments, knowing the story, wouldn't give it, either.

Now New Jersey has cut out the farce. A worker needn't jobhunt if his company was forced to lay off because of re-tooling, shortages, inventory taking, and vacations, *and* expects to rehire in four weeks.

Modesty Doesn't Always Pay

In some families the woman wears the pants. If that had been true in a certain Puerto Rican milk company, they wouldn't have had so much trouble.

As a pants-wearer, one of their women employees probably wouldn't have minded mounting a 7½-ft.- high platform in order to clean a machine.

But as it was, her modesty made her flatly refuse to do so. So she was fired.

An arbitrator, however, overruled her modesty—though not completely. He soaked her with a 3½-months' layoff, then reinstated her.

Seems that other women had, from time to time, done the same work without protest. *(Milk Products Award)*

Turn the page

Speed—ON DECK...

15,000 square feet of roof completed in 8 hours with Kaylo Insulating Roof Tile

As work-day begins, steel sub-purlins are ready for the roof deck of Kaylo Insulating Roof Tile. Lightweight Kaylo Tile (only 5 lbs. per sq. ft.) permits the use of lighter and more economical structural members and foundations.

Placing of tile begun at 8 o'clock, is well under way by mid-morning. Kaylo Roof Tile—a hydrous calcium silicate, *not glass*—has billions of sub-microscopic air spaces giving it light weight and low thermal conductivity.

Grouting of end joints, including cleaning off excess grout, begun shortly after first tile were placed, is almost finished. Kaylo roof deck is incombustible; has more than adequate strength for typical roof loads.

Final step. Covering of the Kaylo roof deck with conventional built-up roofing materials was started as soon as the first section had been grouted. By 4:30, 15,000 sq. ft. of roof has been finished in an eight-hour work-day.

For complete details on Kaylo Insulating Roof Tile, write Dept. N-205, Owens-Illinois Glass Company, Kaylo Division, Toledo 1, Ohio.

see our CATALOG in

KAYLO... first in calcium silicate

...pioneered by OWENS-ILLINOIS Glass Company

MAIN OFFICE: TOLEDO 1, OHIO—KAYLO SALES OFFICES: ATLANTA • BOSTON • BUFFALO • CHICAGO • CINCINNATI • CLEVELAND DETROIT • HOUSTON • MINNEAPOLIS • NEW YORK • OKLAHOMA CITY • PHILADELPHIA • PITTSBURGH • ST. LOUIS • WASHINGTON

Nearly 4000 TYPES of CASTERS & WHEELS

Darnell CASTERS

If you want maximum floor protection, economy and efficiency Demand Darnell Dependability...Made to give an extra long life of satisfactory service . . . . .

DARNELL CORP. LTD. Long Beach 4, Calif.

60 Walker St., New York 13, N. Y.
36 N. Clinton, Chicago 6, Ill.

PRACTICAL LABOR RELATIONS

Begins on page 222

A New Way to Check Job Discrimination

It begins to look as if your state doesn't need to have a fair employment practices law to police discrimination in hiring. At least, not if it follows California's example.

The California Attorney General rules that his state's Employment Stabilization Commission (another name for unemployment insurance agency) can look into hiring discrimination against racial and religious minority groups. The commission is even allowed to inspect company records, hold hearings, issue subpoenas.

How does the Attorney General come to this conclusion?

He reasons that discrimination in employment contributes to unemployment—and unemployment is a legitimate subject for the commission to follow up.

Keep this in mind: 39 states have unemployment compensation laws with provisions that permit the same kind of interpretation.

No Tax on Disability Payments

Let's say that Simmons—one of your employees—is retired because of old age. He also happens to be disabled. Section 22 of the income tax law says compensation for injuries or sickness is exempt from tax. Does Simmons have to pay?

He sure does, says the United States Tax Court. In the court's view, Simmons was retired for old age—not disability.

It doesn't always work this way, of course. Where you have *bona fide* disability retirements, be sure employees are told about tax exemption provisions of the law.

Turn the page

3 Simple "Moves" Show How VERSATILE DELTA TOOLS Solve Production Problems...

1 MOVE THE OPERATOR

To make it easy for the operators of a long-table multiple spindle Delta drill press to move from one work station to another, Albertson and Company, Sioux City, Iowa, devised roller seats that travel on rails. When one man completes his series of operations he passes the work to the next man. Operators can travel the full length of the table with a minimum of fatigue.

2 MOVE THE TOOL

To make easier work of drilling holes in a large, extremely heavy bath-tub casting, Racine Pattern Works, Racine, Wisconsin, mounted a Delta 17-inch drill press on a three-legged spider base, in place of the regular base. Now the casting remains stationary, and it is an easy, simple operation to slide the drill press into several positions for drilling holes in the flange of the casting.

3 MOVE THE WORK

To speed up eleven operations on an aluminum grid casting—including drilling, reaming, counterboring, countersinking—Sangamo Electric Co., Springfield, Ill., uses a Delta 15-foot sectional table and eleven Delta 17-inch drill presses for the individual operations. The casting moves from one machine to the next; and a great deal of costly trucking and handling is eliminated.

These applications are typical of the cost-cutting set-ups devised by Delta users; and illustrate the extraordinary adaptability of Delta tools to unusual production needs.

There's a Delta Power Tool for Your Job— WOOD OR METAL WORKING

53 MACHINES—246 MODELS—MORE THAN 1300 ACCESSORIES

Your Delta dealer is listed in your Classified Phone Directory under "Tools"

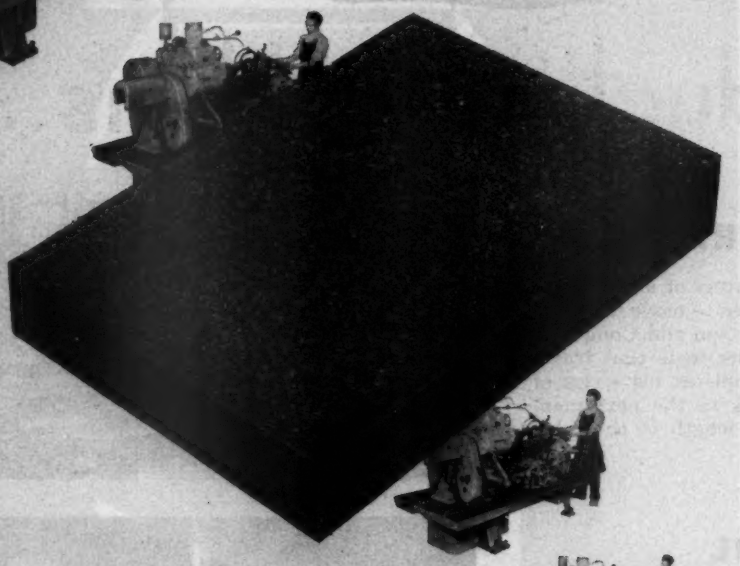
DELTA MILWAUKEE

DELTA POWER TOOL DIVISION

Rockwell MANUFACTURING COMPANY

619M E. VIENNA AVENUE • MILWAUKEE 1, WISCONSIN

KEEP YOUR MAN POWER AT FULL POWER

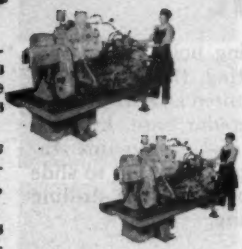


● Better temperature control helps the men and machines in your plant to perform their appointed tasks more comfortably and efficiently. With FOAMGLAS, the cellular glass insulation, you can control temperatures more exactly, more economically. Here's why:

FOAMGLAS is a highly effective insulation and *retains* its insulating efficiency. FOAMGLAS is strong, rigid, long-lasting. FOAMGLAS is moisture-resistant, insect-resistant, rodent-resistant, chemical-resistant.

These features—plus the long-range economy of this Pittsburgh Corning product "the cellular glass insulation"—have led prominent manufacturers all over the country to specify FOAMGLAS for new building and modernization.

Write for sample and free literature.

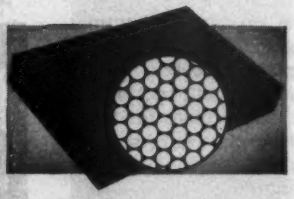


PITTSBURGH CORNING CORPORATION
PITTSBURGH 22, PA.

PITTSBURGH PC CORNING

FOAMGLAS®

the cellular glass insulation



The *best* glass insulation is cellular glass. The *only* cellular glass insulation is FOAMGLAS. This unique material is composed of still air, sealed in minute glass cells. It is light weight, incombustible, verminproof. It has unusually high resistance to moisture, chemicals and other elements that cause insulation to deteriorate.

Pittsburgh Corning Corporation
Dept. N-111, 307 Fourth Avenue, Pittsburgh 22, Pa.

Please send me your free sample and booklet on the use of FOAMGLAS for: Commercial, Industrial and Public Buildings. ☐ Piping and Equipment. ☐

Name.....

Address.....

City..... State.....

▶ *VISIT OUR DISPLAY AT THE 23rd EXPOSITION OF CHEMICAL INDUSTRIES, GRAND CENTRAL PALACE, NEW YORK, NOVEMBER 26—DECEMBER 1, 1951.*

PRACTICAL LABOR RELATIONS

Begins on page 222

How to Be Sure You're Exempt From Walsh-Healey Rules

Don't think you're not covered by the Walsh-Healey Public Contracts Act just because your contract with the government doesn't say in so many words that it is for more than $10,000.

One contractor made a big mistake on this point. No amount was specified in his contract. In fact, actual deliveries under the contract were less than $10,000.

He learned the sad truth from a Public Contracts hearing examiner, however. The law applies unless the contract specifically says it is *not* for a sum over $10,000.

This contractor also learned the hard way that he must keep separate employee records for government contract work. This information was very costly to our contractor. Only 4.4% of his business was government work, but he had to pay 100% of his employees at high Walsh-Healey minimum wage rates. (*Richland Lime*)

Mentally-Ill Employee Ordered Rehired

Mental maladjustments are considered as "sicknesses" by Arbitrator Lloyd H. Baker. So he compelled an employer to rehire a worker who had been under treatment in a mental institution for emotional disturbances and intoxication.

However, on the grounds that the worker may have a relapse, Baker set up a 3-month probationary period.

The employer's contract with the union provided for leave of absence because of sickness. But sickness wasn't defined. (*Atlantic Manufacturing Award*)

Turn the page

KICK "TOO-LITTLE-TOO-LATE" OUT OF OUR LIVES!

★ **THE ABRASIVE PRODUCT**
BAY STATE Koolpore Tool Room Grinding Wheels.

Keep your cutting tools in "fighting" condition. BAY STATE tool wheels manufactured with KOOLPORE specifications are ideally suited for sharpening broaches, cutters, reamers, end-mills, taps, hobs, counterbores, etc. They are ideal because of their extra cool, fast-cutting ability . . . a protection from excess heat that can ruin the edges of your valuable, hard-to-get cutting tools.

Ask for BAY STATE "on-the-spot" engineering help on your next abrasive job.

PHOTO COURTESY LAPOINTE MACHINE TOOL CO.

★ **THE GRINDING JOB**
BROACH SHARPENING. This type of broach is used in finishing the inside diameter of tank track links.

BAY STATE

BAY STATE ABRASIVE PRODUCTS CO., Westboro, Mass.
Branch Offices and Warehouses — Chicago, Cleveland, Detroit, Pittsburgh
Distributors — All principal Cities
In Canada: Bay State Abrasive Products Co. (Canada) Ltd., Brantford, Ontario

★ SECURITY COMES WITH STRENGTH ★

78% fewer hand injuries and 6¢ per man-hour cost saving

follow management study of work gloves

Case No. 207—Problem: Company employing over 1000 men, to shear, form and dip-coat sheet steel products, found production penalized by frequent hand injuries from cuts, heat and acid burns, and resulting infections. Double canvas gloves, used to handle sheets, averaged 4 hours' wear at a cost exceeding 10c per man-hour.

Management Solution: Operations study by an Edmont specialist and on-the-job tests leading to adoption of gloves with tough natural rubber coated palms and thumbs to handle dry sheets, and gauntlets heavily coated with NEOX (reinforced neoprene) for hot galvanized metal and acid baths.

A 78% reduction in hand injuries followed the change-over. The safer gloves also wore 3 to 5 times longer, at average cost-saving of 6c per man-hour. (Name of manufacturer furnished on request.)

Hands are Important Production Tools

Our case records of hundreds of operations with sharp, abrasive or slippery materials, with and without the presence of heat, oils, acids, caustics, solvents and degreasants, prove that correct work glove selection results in:

Fewer lost-time accidents • Faster, surer work handling Less spoilage • Improved job attitude • 40% to 70% savings in usual glove costs to companies or employees

There's a correct glove for every job Good management makes it available

Maximum Protection and Safe Grip
Extremely tough coating of NEOX (reinforced neoprene) over sturdy, sweat-absorbing, insulating fabric. Non-slip safety grip.

Heavy or Standard Weight Coatings
Various weights of NEOX coatings on fabric, overall or palm-and-thumb coated only.

Non-Slip Natural Rubber Coated
Comfortable, safer and wear 5 to 10 times longer than canvas gloves.

Vinyl Plastic Coated Work Gloves
High resistance to abrasion, oils, many chemicals. Retain flexibility.

We offer consulting service on specific problems or complete plant surveys:

(Used by Ford Motor, General Electric, Union Carbide & Carbon, Continental Can, H. J. Heinz, Westinghouse and many others.)

Without cost or obligation we will gladly study your hand-protection problems and practices, make recommendations and furnish the procedures and materials for complete on-the-job tests. For full information, write our Safety Engineering Service.

Edmont Edmont Manufacturing Company
1212 Walnut Street, Coshocton, Ohio

World's largest maker of coated industrial gloves

PRACTICAL LABOR RELATIONS

Begins on page 222

BRIEF—BUT IMPORTANT

No social security or Federal unemployment insurance taxes are due on payments to your former employees now in military service. Makes no difference if you pay full salary or just the difference between that and service pay.

But lump sum going-away payments may be treated otherwise. State rules may vary. Better check your state.

In a new plant, wages paid must meet WSB's standards set up in General Regulation 9. The new plant of the Bridgeport-Lycoming Division of the AVCO Manufacturing Company didn't. So the WSB froze all wages in the plant and asked the plant to notify employees of the action. The plant must now submit a new schedule that will conform to WSB rules. *Important:* Watch this if you're planning a new plant!

No call-in pay for workers who neglect to tell their company about changes in address and telephone numbers, says arbitrator. Ruling applied to employees who reported when there was no work. Company tried to notify them, but couldn't. No call-in pay, said the arbitrator. Contract requires employees to keep the company posted on address changes. Good clause to have. (*Carnegie-Illinois Steel Award*)

WSB regulations shouldn't limit an arbitrator in granting a wage increase, thinks Arbitrator Joseph Rosenfarb. But it's OK to use them as a guide—among other factors to be considered by the arbitrator "in arriving at an equitable resolution of a wage suit." (*Merchants Bank of N. Y. Award*)

Turn the page

Here are the ANSWERS to your AC MOTOR STARTER QUESTIONS

Question: What makes a GOOD Motor Starter?

Answer: Dependability in operation . . . ruggedly built for hard usage . . . long life . . . requiring little attention . . . easy inspection and maintenance.

Question: What makes the new CLARK Type "CY" different?

Answer: An entirely new, advanced principle of arc interruption; combining strong, multi-turn magnetic blowouts and twin-break contacts.

Question: How does this improve its operation?

Answer: Constant forced rotation of the arc—moving continuously from a hot to a cold spot, minimizes burning or pitting of contacts.

Question: How about maintenance?

Answer: Longer contact life means less service. No filing, dressing or cleaning of contacts required. No tools necessary to inspect contacts. Contacts, coils and other components easily changed. The CLARK Type "CY" is the maintenance man's dream!

Phantom View Showing Arc Shield

Question: Is it rugged?

Answer: Mill Type heavy-duty construction and design provide extra protection and dependable operation in severe service.

Question: Any other advantages?

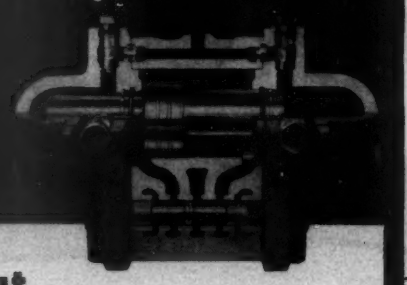
Answer: Many—among them the ingenious design of the solid upper arc shield that prevents accumulation of hot gases between wiring terminals, minimizing phase-to-phase failures.

Let a CLARK application engineer show you what this new line of CLARK Type "CY" Starters means to you in increased production and lower maintenance.

THE CLARK CONTROLLER CO.

ENGINEERED ELECTRICAL CONTROL • 1142 EAST 152ND STREET, CLEVELAND 10, OHIO

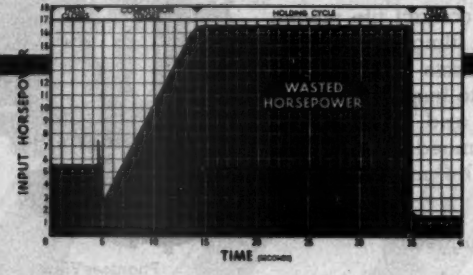
Multiply Pressure



without increasing horsepower

On most presses and in many other applications, pressure requirements change during the operating cycle. The Racine "Variable Volume" low pressure pump with a Racine Pressure Booster can be used to develop and hold up to 5000 psi. The horsepower input does not exceed the power needed to operate the pump at its low pressure setting.

This means lower first cost, less horsepower consumption, reduced cylinder sizes—a more compact over-all design. Pressure and volume delivered can be controlled by one of the built-in governors that are standard for all RACINE pumps.



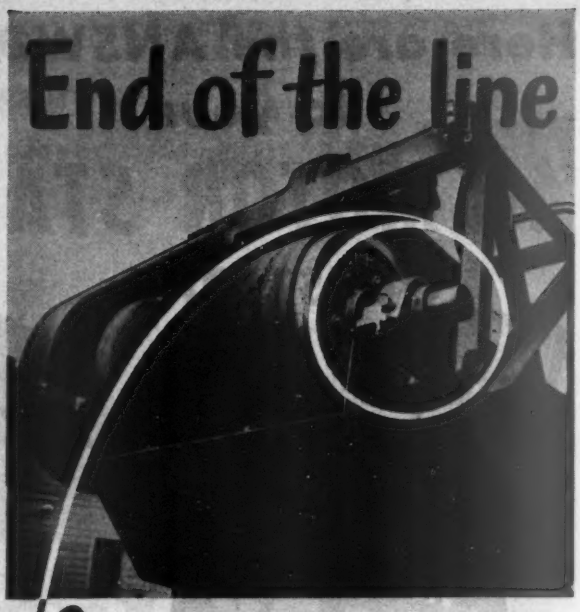
***OPERATING ECONOMIES**—The colored area in the graph above shows the horsepower lost during one holding cycle of a simple press circuit using a constant volume pump. The black area shows the horsepower consumed when a Racine "Variable Volume" Pump and Pressure Booster is used to do the same work.*

OTHER RACINE HYDRAULIC PRODUCTS

RACINE

RACINE

End of the line for tramp metal



Permanent magnets inside pulley cause tramp metal to cling to belt as coal feeds by and drops off. After belt passes underside of magnetized pulley, tramp metal drops into separate bin.

Metallic scrap in coal has long played serious havoc in furnace machinery—industrial or home. But, thanks to this new Homer Permanent Magnet Separator Pulley for coal conveyors, all harmful tramp metal can now be removed while loading for shipment.

Here, as in so much of industry's hard working equipment, you'll find Shafer ConCaVex Pillow Blocks on the job . . . minimizing friction, reducing power consumption, compensating for misalignments, providing reserve load and shock capacities and protection against the ravages of extreme weather, dust and dirt conditions that are part-and-parcel of coal processing operations.

Shafer ConCaVex bearing units (famous for a third of a century) are available in a full range of types and sizes that cover hundreds of industrial requirements—and probably yours. Write for Industrial Bearing Catalog No. 51.

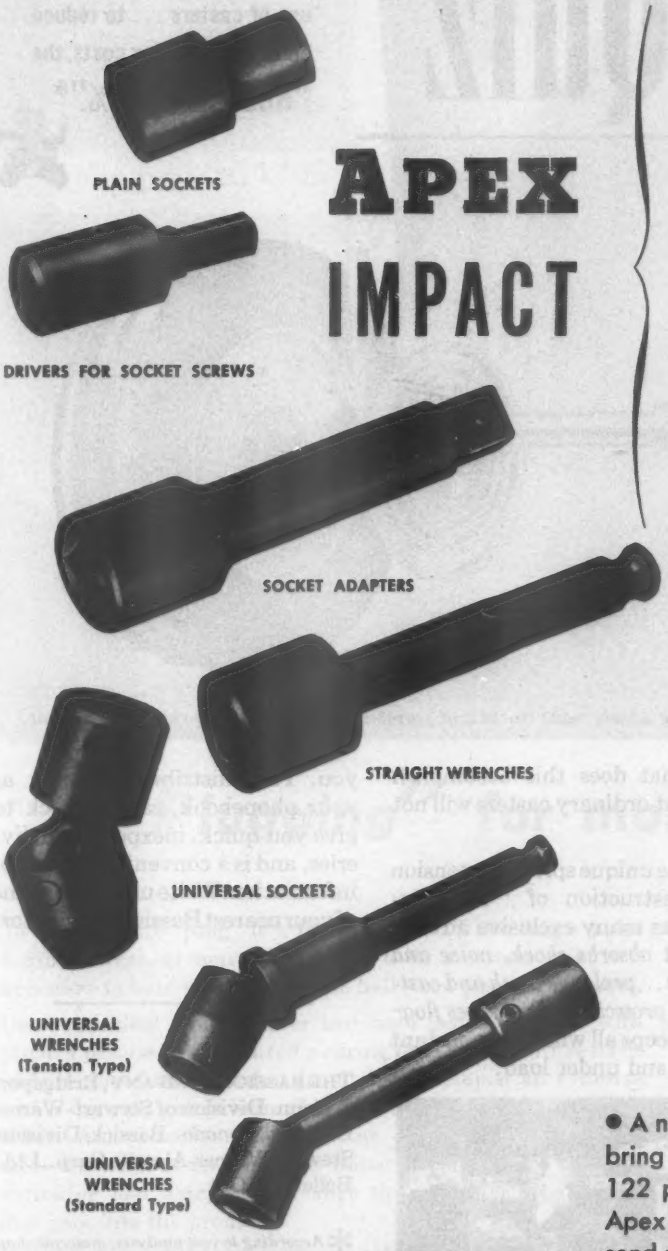
Aircraft Bearings, Too!

Single row, double row, rod end types—for all control mechanisms—for all types of air-borne craft. Write for Aircraft Bearing Catalog No. 50

SHAFER CONCAVEX

SHAFER BEARING CORPORATION
801 BURLINGTON AVE.
DOWNERS GROVE, ILLINOIS

for EVERY nut running operation . . .



APEX IMPACT

- Sockets
- Extensions
- Adapters
- Universal Wrenches

Here is a complete line of production tools—specifically designed to meet every nut running requirement—specifically built to withstand the strain and shock of impact tool operation.

Apex impact sockets, extensions, adapters and universal wrenches are available in thousands of stock types and sizes, each precisely machined from high carbon, electric furnace alloy steel, cold broached and heat treated to insure greater freedom from quick wear-out and breakage.

For production or maintenance nut running work, specify Apex—for longer service life, greater output per tool and lower tool costs.

• A note, on your company letterhead please, will bring your copy of the new Apex Catalog 29—122 pages of helpful data on more than 5,000 Apex impact tools. For special applications, just send sketch or blueprint for prompt quotation.

APEX TOOLS

sockets, extensions, adapters

THE APEX MACHINE & TOOL COMPANY

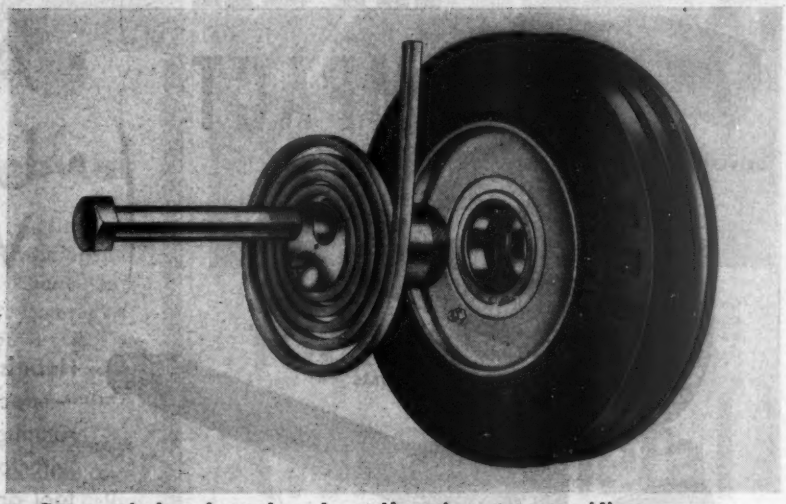
1025 S. Patterson Blvd., Dayton 2, Ohio

POWER BITS, INSERT BITS AND BIT HOLDERS, FOR PHILLIPS, FREARSON (Reed & Prince), SLOTTED, CLUTCH HEAD and SOCKET HEAD SCREWS • HAND DRIVERS FOR PHILLIPS, FREARSON AND CLUTCH HEAD SCREWS • TWO-PIECE DRIVERS FOR HEX HEAD SCREWS • SOCKETS, EXTENSIONS, ADAPTERS AND NUT SETTERS • UNIVERSAL SOCKETS, EXTENSION WRENCHES AND ADAPTERS • AIRCRAFT AND INDUSTRIAL UNIVERSAL JOINTS • SELF-RELEASING AND ADJUSTABLE STUD SETTERS • SAFETY FRICTION TAPPING CHUCKS • VERTICAL FLOAT TAPPING CHUCKS.

Caster Quiz

A "quick facts" feature with helpful suggestions on the use of casters . . . to reduce materials-handling costs, the "Reducible 30%."*

Bassick's "Floating-Hub" Caster rides over bumps without lifting the load. It comes in a wide range of sizes (6 to 16 in.) for a wide range of jobs. Write for Catalog 124A for information on the complete line of truck casters, including data on "Floating-Hub".



Sprung wheels make trucks and portable equipment as easy riding as your car.

Q What's the "Floating-Hub"?

A A shock-absorbing mechanism built in wheels and casters, providing mechanical resiliency between the rim of a wheel and the axle.

Q Is it important?

A It is the most important development in wheel and caster construction in years. "Floating-Hub" applies a "knee-action" principle to wheels and casters.

Q How does it work?

A A hub, on which the wheel revolves, "floats" in the frame, controlled by a spring of predetermined capacity which holds the wheel in balanced position.

Q What does this accomplish that ordinary casters will not do?

A The unique spring suspension construction of "Floating-Hub" has many exclusive advantages. It *absorbs shock, noise and vibration . . . prolongs truck and caster life . . . protects loads . . . saves floor wear* . . . keeps all wheels in constant contact and under load.

Baggage carts and trailers can be towed at high speeds with "Floating-Hub" Casters.

Q Why should you buy Bassick Casters from a local industrial distributor?

A Bassick believes in this form of distribution because it means faster, better service for you. Your distributor, handy as your phonebook, carries stock to give you quick, inexpensive deliveries, and is a convenient source of information. Write us for the name of your nearest Bassick distributor.

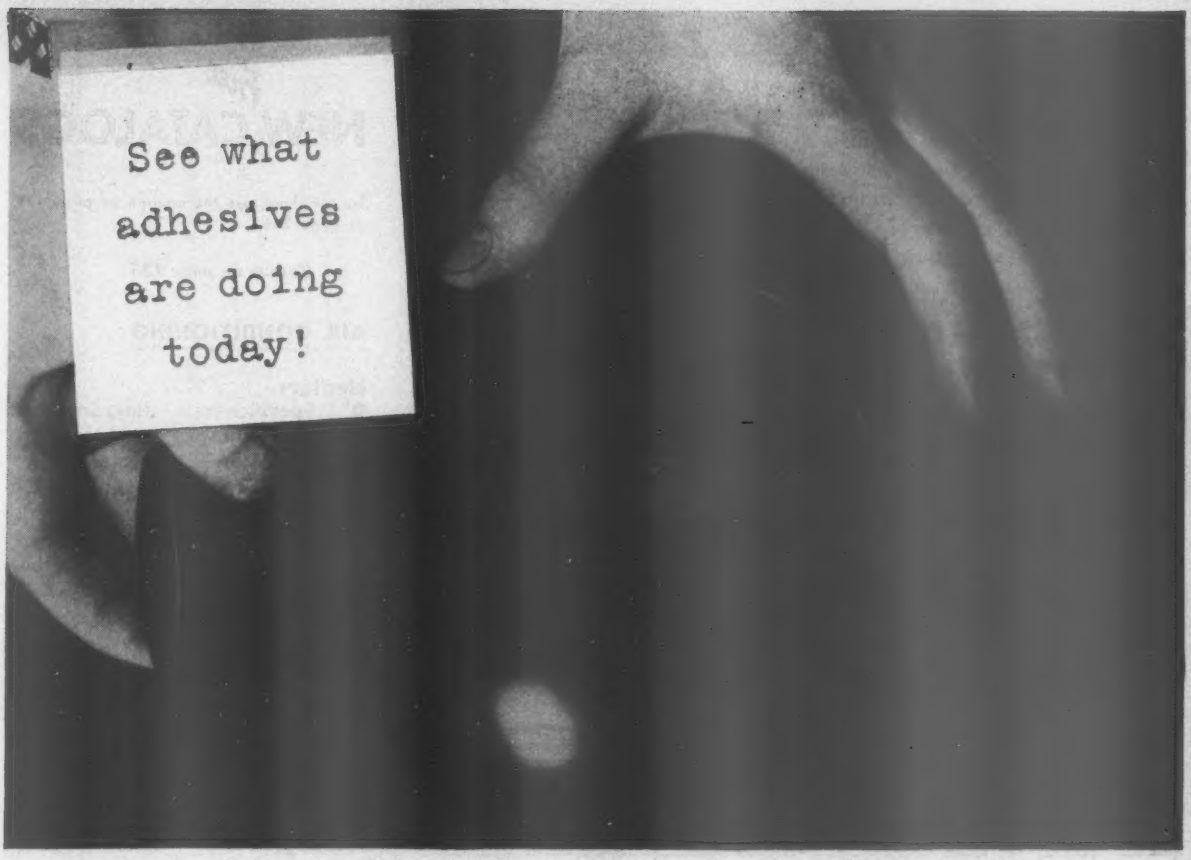
THE BASSICK COMPANY, Bridgeport 2, Conn. Division of Stewart-Warner Corp. *In Canada:* Bassick Division, Stewart-Warner-Alemite Corp., Ltd., Belleville, Ont.

* *According to cost analysts, materials-handling (about 30% of total cost) affords about the only real opportunities for cost reduction today.*

SEE OUR CATALOG IN SWEET'S

Bassick

MAKING MORE KINDS OF CASTERS . . . MAKING CASTERS DO MORE

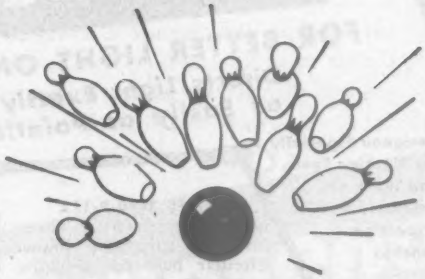


"Plugging" for more strikes

To bowlers, the "plug" is a familiar sight. When finger holes begin to wear, or must be changed to fit a certain grip, it is necessary to bore new holes in the ball—and plug the old ones.

One prominent manufacturer had been installing plugs with pitch, a process that required a curing time of four or five days, and produced an imperfect bond. 3M developed an adhesive which not only gave a better bond, but speeded drying time by *400%*. And when you consider the conditions the adhesive met—tremendous resistance to impact, temperature changes, shrinking and aging—you realize the extensive engineering that goes into the product.

It is this same ability to engineer each compound to a specific use that makes *all* 3M adhesives, coatings and sealers *tops in performance!*



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OVER 1,000 BASIC

ADHESIVES · COATINGS · SEALERS

See what adhesives can do for you . . .

Call the 3M office in your city and investigate, with the help of a laboratory-trained field engineer, the potential that adhesives hold for you. And for more information and a valuable 32-page booklet, write 3M, Dept. 311, in Detroit.

ADHESIVES AND COATINGS DIVISION • MINNESOTA MINING AND MANUFACTURING COMPANY
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GENERAL OFFICES: ST. PAUL 6, MINN. • EXPORT SALES: 270 PARK AVE., NEW YORK 17, N.Y.
MINNESOTA MINING & MANUFACTURING CO. OF CANADA LTD., LONDON, CANADA

FOILED AGAIN!

Those three little villains — Dust, Dirt, and Grit—are *foiled every time* they match their wits against a CLEMENTS - CADILLAC blower - suction cleaner. It blasts them out of every nook and cranny of your machinery and equipment — quickly, easily, and economically.

Eligible under NPA Regulations $2 and $4.

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ASK YOUR MILL SUPPLY DEALER OR WRITE US FOR DATA

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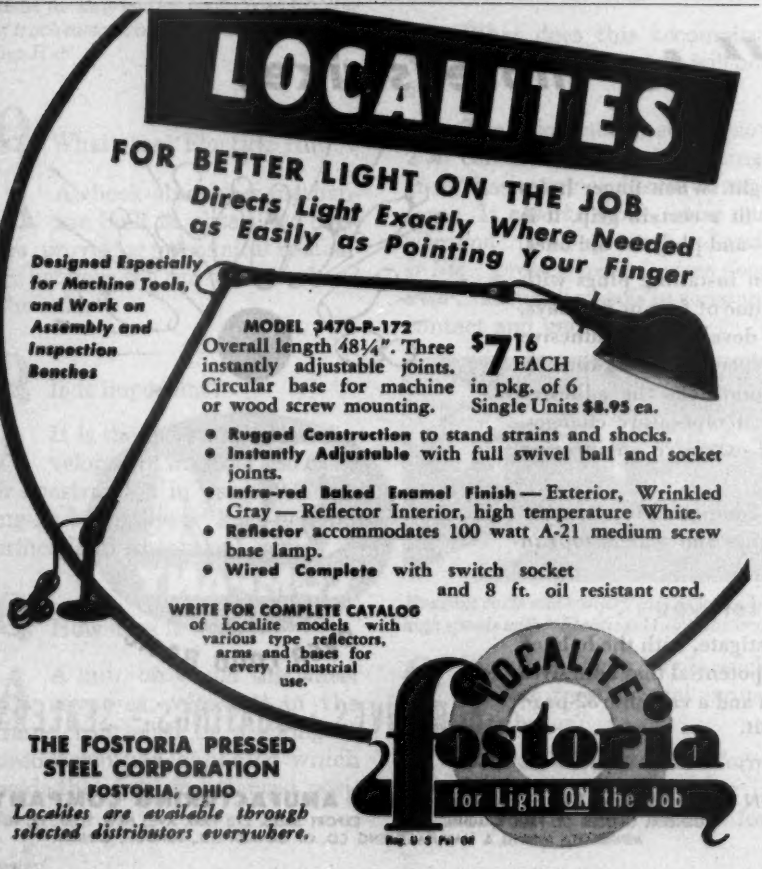
FOR BETTER LIGHT ON THE JOB

Directs Light Exactly Where Needed as Easily as Pointing Your Finger



Designed Especially for Machine Tools, and Work on Assembly and Inspection Benches

MODEL 3470-P-172
Overall length 48¼". Three instantly adjustable joints. Circular base for machine or wood screw mounting.

$7.16 EACH in pkg. of 6
Single Units $8.95 ea.

- **Rugged Construction** to stand strains and shocks.
- **Instantly Adjustable** with full swivel ball and socket joints.
- **Infra-red Baked Enamel Finish** — Exterior, Wrinkled Gray — Reflector Interior, high temperature White.
- **Reflector** accommodates 100 watt A-21 medium screw base lamp.
- **Wired Complete** with switch socket and 8 ft. oil resistant cord.

WRITE FOR COMPLETE CATALOG of Localite models with various type reflectors, arms and bases for every industrial use.

THE FOSTORIA PRESSED STEEL CORPORATION
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Localites are available through selected distributors everywhere.

LOCALITE fostoria for Light ON the Job

Reg. U. S. Pat. Off.

Free NEW CATALOGS

To get them, use the coupon on page 135 or page 244.

Begins on page 135

AIR CONDITIONING

Heaters

8 Specifications, diagrams, illustration, of instantaneous water heaters, converters, fuel oil heaters, indirect water heaters, coil-heated tanks and tank heating units. Installation instructions, handy conversion tables. Twelve pages. General Fittings Co.

Heaters

9 Direct-fired heaters get the whole show in this 18-page catalog. You'll find sample installations, descriptions of various parts, specifications, drawings. Airtherm Manufacturing Co.

MATERIALS HANDLING

Iron Hand

10 This 8-page bulletin shows how a relatively new materials handling device can be adapted to different jobs, gives features and specifications. Sahlin Engineering Co.

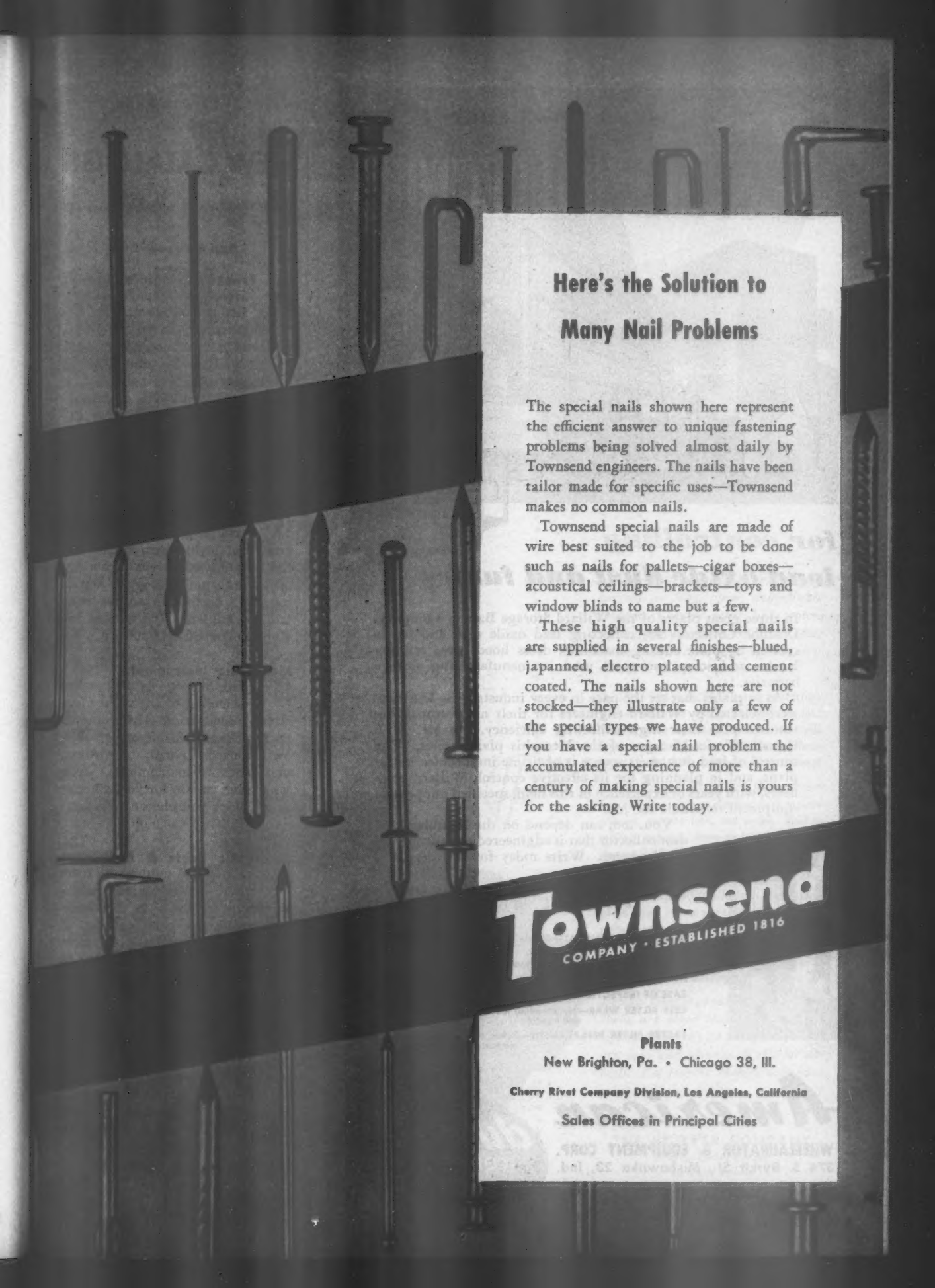
Conveyors

11 This folder gives the features, specifications, and operating instructions for a pivoted bucket - type conveyor. There's an assembly diagram and a dimensioned drawing of a pivoted bucket-carrier circuit. Hapman Conveyors, Inc.

Fork Trucks

12 There's engineering and operating information on heavy-duty fork trucks in this 6-page bulletin. You'll find application photographs and detailed engineering data. Drawings and cut-away sections. Baker Industrial Truck Division of the Baker-Raulang Co.

Turn the page



Here's the Solution to Many Nail Problems

The special nails shown here represent the efficient answer to unique fastening problems being solved almost daily by Townsend engineers. The nails have been tailor made for specific uses—Townsend makes no common nails.

Townsend special nails are made of wire best suited to the job to be done such as nails for pallets—cigar boxes—acoustical ceilings—brackets—toys and window blinds to name but a few.

These high quality special nails are supplied in several finishes—blued, japanned, electro plated and cement coated. The nails shown here are not stocked—they illustrate only a few of the special types we have produced. If you have a special nail problem the accumulated experience of more than a century of making special nails is yours for the asking. Write today.

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COMPANY · ESTABLISHED 1816

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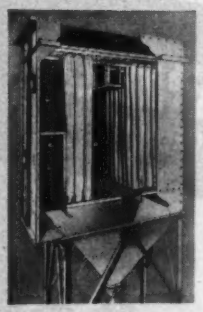
for controlling lead oxide dust and fumes

In three great plants of the Willard Storage Battery Company, Dustube Collectors are collecting lead oxide dust and fumes created by plate cutting machines, dross hoods over refining kettles and scrap conveyors used in manufacturing storage batteries.

As in plants that set the pace in every industry, the Dustubes were selected by Willard engineers for their many cost-saving features plus their high collecting efficiency. As Mr. R. J. Halsall, Works Manager of the Memphis plant writes, "The control of lead dust at its source is of prime importance in our plant, and in planning for its effective control, Willard engineers, with years of experience in this field, specified our present equipment to handle the job."

You, too, can depend on the Dustube for a dust collector that is engineered to your specific requirements. Write today for full details.



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BETTER DUST REMOVAL—Simple, fast, thorough. Shortens cleaning time.

POWER SAVINGS—Lower resistance to air flow. Lower air velocities.

HIGH EFFICIENCY—Nearly 100% efficient by convincing tests.

EASE OF INSPECTION—Clean, safe, simple. No parts to remove.

LESS FILTER WEAR—No abrading metal contact. Easy to ship, store and handle.

FASTER FILTER REPLACEMENT—Takes only a few seconds. Requires no tools.

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dustube COLLECTORS

Free NEW CATALOGS

To get them, use the coupon on page 135 or page 244.

Begins on page 135

Lift Trucks & Mobile Cranes

13 Here's a 12-page catalog listing capacities and dimension specifications on high- and low-lift platform trucks, fork trucks, and mobile cranes. Gives brief descriptions of construction features and presents materials handling ideas in pictures. Elwell-Parker Electric Co.

ELECTRICAL EQUIPMENT

Electronic Controls

14 Bulletin tells how to control temperature, pressure, flow, and level electronically. It has photos, schematic drawings of several models, gives transmission information on the control mechanisms. Dimensions included. The Swartwout Co.

Measuring Instruments

15 This 30-page catalog makes selection of the right electrical measuring instruments easier. Gives full line of portable, switchboard, panel, recording, and socket instruments, tells what each can do for you. Check-chart helps you choose. Westinghouse Electric Corp.

Electronic Parts & Equipment

16 Parts and equipment from many electronics manufacturers are listed in this comprehensive 208-page catalog. It gives full information on prices and sizes, has a helpful index at the back. Pictures to make selection easier. Allied Radio Corp.

Electronic Parts & Equipment

17 Here's another good one. It's a complete buying guide. You get information on sound systems, test equipment, electronic equipment, tubes, parts, tools, books, and kits. Concord Radio Corp.

Turn the page

When you pay for your reputation . . .

Hoover®
ELECTRIC MOTORS

guard your good name

When you buy any kind of production equipment, your reputation with the "boss" may hang on that equipment's performance.

Not only that, in times like these your company's reputation may depend on production equipment that stays on the job, performs reliably, and keeps production humming. This is why so many plant managers and purchasing agents specify Hoover Motors as original equipment or replacements.

Hoover general-purpose motors are famous for long, quiet, dependable service. They're built like motors costing far, far more. And they come in three basic types to fit your requirements, whatever they are:

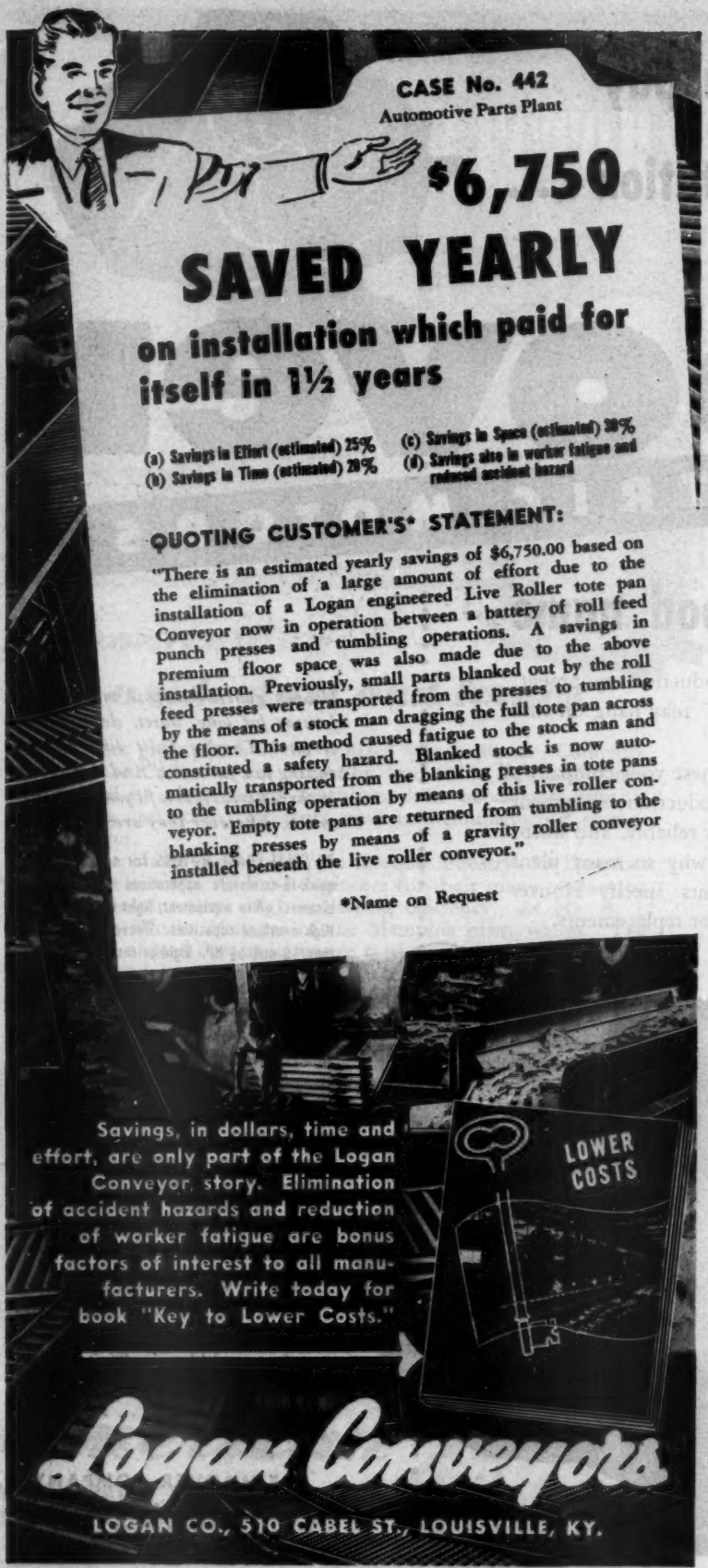
1. SPLIT-PHASE MOTORS for easy-starting, quick-to-accelerate applications such as fans, blowers, office equipment, light machine tools. High overload capacities. Sleeve or ball bearings, ¼ and ⅓ HP. Rigid or resilient mounted.

2. CAPACITOR-START MOTORS for hard-starting, continuous-duty applications such as compressors, machine tools, and pumps. Rigid or resilient mounted, sleeve or ball bearings, ¼ through 1 HP. Rigid-mounted ball bearing only through 3 HP.

3. POLYPHASE MOTORS for use where three-phase supply lines are available. Start without reduced voltage compensator. Low-cost operation. Rigid mount or resilient mount, ball bearings, or sleeve bearings, ¼ through 1 HP. Rigid-mounted ball bearing only through 5 HP.

Besides these general-purpose motors, there are other Hoover Motors designed especially for pumps, oil burners, fans and blowers. Write for details. Let Hoover Motors help your company's reputation . . . and your own!

THE HOOVER COMPANY
Kingston-Conley Division
68 Brook Avenue
North Plainfield, New Jersey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Automotive Parts Plant
$6,750
SAVED YEARLY
on installation which paid for itself in 1½ years
(a) Savings in Effort (estimated) 25%
(b) Savings in Time (estimated) 28%
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(d) Savings also in worker fatigue and reduced accident hazard
QUOTING CUSTOMER'S* STATEMENT:
"There is an estimated yearly savings of $6,750.00 based on the elimination of a large amount of effort due to the installation of a Logan engineered Live Roller tote pan Conveyor now in operation between a battery of roll feed punch presses and tumbling operations. A savings in premium floor space was also made due to the above installation. Previously, small parts blanked out by the roll feed presses were transported from the presses to tumbling by the means of a stock man dragging the full tote pan across the floor. This method caused fatigue to the stock man and constituted a safety hazard. Blanked stock is now automatically transported from the blanking presses in tote pans to the tumbling operation by means of this live roller conveyor. Empty tote pans are returned from tumbling to the blanking presses by means of a gravity roller conveyor installed beneath the live roller conveyor."
*Name on Request
Savings, in dollars, time and effort, are only part of the Logan Conveyor story. Elimination of accident hazards and reduction of worker fatigue are bonus factors of interest to all manufacturers. Write today for book "Key to Lower Costs."
LOWER COSTS
Logan Conveyors
LOGAN CO., 510 CABEL ST., LOUISVILLE, KY.

Free NEW CATALOGS

To get them, use the coupon on page 135 or page 244.

Begins on page 135

Welding Cable Connection

18 A whole showcase of electric welding fittings is right in front of you when you look at this 12-page catalog. You get specifications and prices of electrode holders, ground clamps, connectors, splicers, and lugs. Information on care and maintenance of welding cables and connections. Tweco Products Co.

Electronic Tubes

19 This 28-page catalog gives complete specifications and prices of industrial electronic tubes from many manufacturers. Illustrations and descriptions will help you select tubes. Series of pilot-light assemblies listed. Milo Radio & Electronics Corp.

Frequency Converters

20 Here's the story on induction frequency converters with complete specifications, schematic drawings, and descriptions. The bulletin gives operating data, application information, tips on preventive maintenance. General Electric Co.

Circuit Breaking Plugs

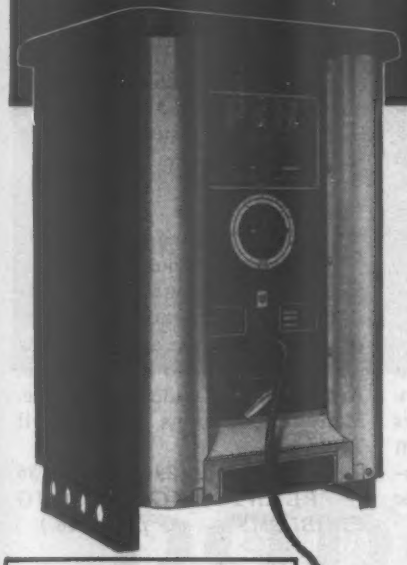
21 This bulletin has sketches and specification charts of a complete line of circuit-breaking plugs and receptacles. Schematic drawings show how you set it up and cut-away drawings show what makes it tick. The Pyle-National Co.

Motor Controls

22 A comprehensive catalog of 84 pages, filled with operating instructions, dimensions, and price lists for the motor controllers. You'll find complete descriptions and photographs of parts and equipment. Data on relays, switches, pushbuttons, and clamps. Clark Controller Co.

Turn the page

THAT P&H AC WELDER LOOKS GOOD TO ME, JIM. WE CAN GET IT OFF THE FLOOR —AND HAVE MORE ROOM TO WORK!
THAT'S RIGHT, BILL— AND WITH CONTROL AT THE WORK WE GET MORE DONE, AND DO IT BETTER!



Save floor space, cut welding time for more production at lower cost

. . . . use P&H AC Arc Welders with exclusive Dial-lectric remote control

Give yourself more room for your production needs. Mount your P&H Welder off the floor, out of the way.

Dial-lectric remote control lets you do this. Your operator can turn the heat on *at the work.* It also cuts down his "walking time" . . . turns it into *welding* time for increased output.

Besides saving space P&H Dial-lectric control eliminates cores, coils, sprockets, gears and other moving parts that cause excessive maintenance and downtime.

P&H AC Welders are available in a full range of sizes up to 625 amps. See your P&H representative or distributor for full details on how this outstanding welder can save you time and money.

Specialized Training

Metal Welding Fabrication

1 week to 18 months

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Excavators • Overhead Cranes • Hoists • Arc Welders and Electrodes • Soil Stabilizer • Crawler and Truck Cranes • Diesel Engines • Cane Leaders • Pre-assembled Houses

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A 6000-LB. LIFT!

at a touch of Suzy's featherlight fingertips!

Yes, *Fingertip Control* on the new Revolvator Go-Getter enables anyone to pick up a wacking big lift-and-carry load. *Anyone!*

Think what this means in the face of rapidly increasing work-costs; in terms of reducing occupational-accident hazards. You don't need skilled labor — husky muscle-men—to operate Fingertip Control Revolvators.

This control feature and many more are *exclusive* with the Revolvator Go-Getter electrically-operated pallet-type truck, which hydraulically lifts a full four inches in four seconds. It lowers loads just as gently...smoothly... quietly as it lifts. Positively braked with deadman safety control. Comparable, practically, to the way little Suzy handles her doll carriage, but a whole lot surer and faster.

Go-Getter

Smoothly turns with no steering push-and-pull up to a full 200° arc, within its own length. 2 and 3-ton models.

REVOLVATOR CO.

Designers and Manufacturers of Materials Handling Equipment Since 1904

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Gentlemen:
We want to know, without obligation, all about Revolvator Go-Getter *Fingertip*-Control Lift Trucks

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IMPORTANT NEW Free CATALOGS

To get them, use the coupon below — or the duplicate on page 135.

Begins on page 135

MISCELLANEOUS

Speed Reducers, Gearmotors

23 90 pocket-size pages filled with information on selecting speed reducers and gear changers, well illustrated with drawings and specification sheets. There are charts, tables, and parts lists. Abart Gear & Machine Co.

Process Industry Service

24 Details on special fabricated plate services, heat transfer equipment, steel storage tanks, wood tanks, automatic control equipment, vent valve flame-arrestors, safety heads, walkways, and stairways. Features and specifications for each. Black, Sivalls & Bryson, Inc.

Magnetic Separators

25 This catalog tells you about magnetic separation. It gives applications, and shows you how to remove and reclaim iron from both wet and dry materials. 12 pages. Dings Magnetic Separator Co.

Impregnating Process

26 Here's an 8-page bulletin about impregnators. Models and dimensions are listed, and there's a price list included. Information on salvaging rejected castings by impregnation. Metallizing Co. of America.

Planning Equipment

27 An 80-page catalog tells the story of 3-dimensional planning, gives information on making reproduction prints. More than 6000 scale models of machine tools listed. Prices; delivery data. Visual Planning Equipment Co., Inc.

Tools

28 This 96-page catalog lists glaziers' tools, scrapers, paint and floor conditioning machines, and hardware specialties. Gives specifications and directions for application and maintenance. Arranged for quick reference. Many illustrations. Red Devil Tools.

(For catalogs 29 through 36 — PLANT ENGINEERING PROBLEMS — see page 246.)

DUPLICATE COUPON ON PAGE 139

MAIL THIS COUPON FOR FREE CATALOGS *(Good until Jan. 31 1952)*

FACTORY MANAGEMENT & MAINTENANCE (November, 1951)
330 W. 42nd St., New York 18

I'm circling the numbers of the catalogs and bulletins I want:

1	2	3	4	5	6	7	8	9	10	11	12	13
14	15	16	17	18	19	20	21	22	23	24	25	26
27	28	29	30	31	32	33	34	35	36			

Name ..... Title .....

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THE SPEED REDUCER THAT SAVES YOU MONEY!

Dodge

Torque-Arm

America's Most Complete Line of Shaft-Mounted Speed Reducers

- No special engineering required. No foundation to provide. No flexible couplings. No sliding base. No "lining-up" difficulties. No expensive installation. Stock TAPER-LOCK sheaves prescribed for each job to provide desired speeds. Application to other machines is practical and easy.
- Unit is driven through any V-Belt Drive. Torque-arm, fastened to any fixed object, anchors the reducer unit. Turnbuckle provides fast and accurate adjustment of belt tension.
- Backstop available from stock when required. Simple. Positive. Easily installed. Sealed inside the reducer housing.
- Compact, light weight, *rugged*. Quality built by Dodge for Dodge *dependable* service.
- Built in two series—Single and Double Reduction. Capacities from 1 to 27 h. p. Speeds from 12 to 330 rpm. Available from distributors' stocks.
- WRITE for special bulletin A602.

DODGE MANUFACTURING CORPORATION, 400 Union Street, Mishawaka, Indiana

DODGE
of Mishawaka, Ind.

CALL THE TRANSMISSIONEER, your local Dodge Distributor. Factory trained by Dodge, he can give you valuable assistance on new cost-saving methods. Look for his name under "Power Transmission Equipment" in classified phone book.

FIRST IN POWER TRANSMISSION MACHINERY!

V-BELTS AND TAPER-LOCK SHEAVES

DODGE-TIMKEN PILLOW BLOCKS

ROLLING GRIP AND DIAMOND D CLUTCHES

SOLID STEEL CONVEYOR PULLEYS

FOR YOUR NAME PLATE REQUIREMENTS, WRITE OUR SUBSIDIARY, CHICAGO THRIFT-ETCHING CORPORATION, 1555 SHEFFIELD AVENUE, CHICAGO, ILLINOIS

INDUSTRY'S BUSIEST ELECTRIC TRUCKS are equipped with

READY-POWER
GAS-ELECTRIC POWER UNITS
Ready-Power-Equipped Baker Crane Truck
This Automatic Skylift Giant is Ready-Power Equipped
Ready-Power-Equipped Clark Fork-Lift
Mercury Platform Powered by Ready-Power
Jeio Worksaver Pallet Truck with Ready-Power
Ready-Power-Equipped Elwell-Parker Truck

Where electric trucks must be on the go 24 hours a day . . . where full loads must be carried without interruption . . . Ready-Power meets every qualification.

Always dependable, always economical, Ready-Power Units generate *constant* power right on the truck chassis. Models for all sizes, types and makes of electric trucks.

The READY-POWER Co.
3820 Grand River Ave., Detroit 8, Michigan

Good Ways to Solve Special PLANT ENGINEERING PROBLEMS

You can get catalogs suggested as answers to these problems by using coupons on pages 135 or 244.

HOW TO MAKE YOUR WIRE CONVEYOR BELTS LAST LONGER: Replacement belts won't be so easy to get, says The Cambridge Wire Cloth Company, in these days of metal shortages. It has issued a series of "Belt Hints" on proper installation and care of belts in high-temperature service. *(Circle No. 29 on coupon on page 135 or 244.)*

DO YOU NEED GUARDS ON PORTABLE TOOLS TO PROTECT NEW WORKERS? Name any type of portable tool; Morrison Products Inc. says it can give you a safe, light, strong guard cheaper than you can make it. These include guards for straight grinding wheels, flexible shaft equipment, angle grinders, sanders, and polishers. *(Circle No. 30 on coupon on page 135 or 244.)*

DO YOU NEED MORE MODERN POWER EQUIPMENT? There are big dollar savings in rebuilding what you have, suggests BFM Industries, Inc.—not to mention delays you face in getting new equipment. Illustrated booklet "Facts" shows types of work BFM can handle. *(Circle No. 31 on coupon on page 135 or 244.)*

HAVING TROUBLE WELDING NICKEL ALLOYS? Then you'll want to see International Nickel's 44-page technical bulletin T-2 on fusion welding by electric arc or gas. It's packed full of illustrated data and instructions on everything from preparation of surface to inspection methods. *(Circle No. 32 on coupon on page 135 or 244.)*

Turn the page

A user REPORTS...

After their satisfactory experience with the 500,000 C. M. insulated aluminum cable (at right), National Supply Co., Torrance, Cal., says, "We will seriously consider aluminum when similar installations are planned." These cables, insulated with RH 600 v. U. S. Paracore, are connected to bus, from which they carry current to distribution panels for such heavy loads as welding machines, shears, rolls and other equipment.

figure it in ALUMINUM and you figure it low

When you plan new production lines, add feeders for heavier loads, get prices both ways—in aluminum and in copper. You'll find you can make worth-while savings with aluminum . . . and installation is faster, easier because of aluminum's light weight.

Although the rearmament program restricts the use of aluminum, we are ready to help you with the planning for trouble-free, low-cost wiring.

FREE INSTALLATION BOOK

"Questions and Answers" on installation of aluminum conductors. Write for it now — ALUMINUM COMPANY OF AMERICA, 1771L Gulf Bldg., Pittsburgh 19, Penna.

Aluminum Conductors

ALCOA ®

of ALCOA EC ALUMINUM are made by leading manufacturers

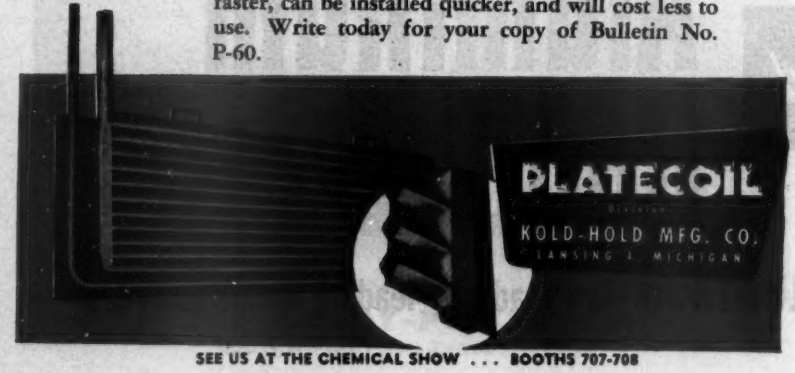
find PLATECOILS more profitable to use

It is less costly to buy and install Platecoils than it is to fabricate pipe coils in their own plant according to Robert Dill, Plant Superintendent of the Newcomb-Detroit Company, Grand Rapids Division. In building the hot rinse tank pictured above they have realized many advantages resulting from the use of Platecoils both for themselves and their customer, Kalamazoo Stove and Furnace Co.

Starting with the original estimate, sales engineers find it much easier to determine the coil size from the convenient Platecoil chart. And Platecoils can be depended upon to deliver the amount of heat specified in their B.T.U. rating. In the construction of the tank, Platecoils are easier to handle and fabrication time and labor are reduced. A Platecoil with the equivalent B.T.U. capacity as pipecoil takes only half the space in the tank thus leaving greater working area. This is important also to Kalamazoo Stove and Furnace Co. as the user.

The extra tank capacity comes in handy in the use of the tank as part of an acid etching system used for pickling aluminum prior to spot welding on aircraft parts. And the higher B.T.U. capacity of the Platecoils provides faster heating and quicker starts.

Wherever pipecoils are used, Platecoils will heat faster, can be installed quicker, and will cost less to use. Write today for your copy of Bulletin No. P-60.



SEE US AT THE CHEMICAL SHOW . . . BOOTHS 707-708

Good Ways to Solve Special PLANT ENGINEERING PROBLEMS

You can get catalogs suggested as answers to these problems by using coupons on pages 135 or 244.

Begins on page 276

NOW YOU CAN SOLVE THAT WATER HAMMER PROBLEM: Whether it's in pipelines for beer, gasoline, acids, paper stock, or just plain water, the basic causes, effects, and ways to cure, says The Williams Gauge Co., hold equally true. Bulletin WH-851, based on several hundred tests, tells how to avert costly damage. *(Circle No. 33 on coupon on page 135 or 244.)*

IF YOU'VE GOT A SHEET PILING JOB TO DO: Big job or small, consider "The Advantages of Renting Steel Sheet Piling," says L. B. Foster Co. in an illustrated brochure of that title. You get fast service, low-cost investment, lower labor costs, dependable structure. *(Circle No. 34 on coupon on page 135 or 244.)*

ARE PRODUCTION MEN ASKING YOU TO INSTALL REMOTE MECHANICAL CONTROLS? Then look into Tru-Lay flexible push-pull controls, which can be snaked around corners—no rods, levers, or bellcranks—and will handle loads up to 1000 pounds. A 12-page booklet, "The Key to Remote Control," by American Chain & Cable Co., tells how. *(Circle No. 35 on coupon on page 135 or 244.)*

WHAT PROTECTIVE COATING IS BEST? Whether your surface is metal, an interior or exterior wall, or a concrete floor, or whether your problem is moisture, corrosion, fungus, or wear, Wilbur and Williams offers a special paint to fit each case. Bulletin 15WI shows how to pick the right one. *(Circle No. 36 on coupon on page 135 or 244.)*

It took craftsmanship to build locomotives by hand!

The French inventor, Nicholas Cagnot, had no other choice.

In 1769, machines were not available to help him build his pioneer steam locomotive . . . with a speed of four miles per hour, and a stop every fifteen minutes to build pressure.

Cagnot applied his craftsmanship to every part, including the bolts and nuts. He gave great heed to forming his fasteners, knowing that the strength of his entire assembly rested on them.

Makers of modern locomotives are even more aware of the need for quality fasteners. They know fine fasteners are vital to today's stepped-up production . . . to speed and strengthen assembly, save scarce materials by reducing wasteful rejects. Fortunately, these contemporary craftsmen have *specialists* to aid them, like the RB&W worker in the illustration. He specializes in fasteners alone, devoting a craftsman's skill to producing bolts, nuts, screws and rivets of uniform accuracy, dependability and physical properties . . . backed up by 106 years of RB&W experience in making the finest fasteners.

We're working full speed to make strong the things that make America strong. We welcome your fastener problems. Address your inquiries to RB&W at Port Chester.

RUSSELL, BURDSALL & WARD BOLT AND NUT COMPANY

RB&W *the complete quality line*

106 YEARS MAKING STRONG
THE THINGS
THAT MAKE AMERICA STRONG

Plants at: PORT CHESTER, N. Y., CORAOPOLIS, PA., ROCK FALLS, ILL., LOS ANGELES, CALIF. *Additional sales offices at:* PHILADELPHIA, DETROIT, CHICAGO, DALLAS, OAKLAND. *Sales agents at:* PORTLAND, SEATTLE. *Distributors from coast to coast.*

New! CONTINUOUS SAMPLING MONITOR

G-E Continuous Sampling Monitor used in plant of large eastern appliance manufacturer.

Insures Your Average Outgoing Quality Limit

Now you can keep track of complex inspection techniques with the Continuous Sampling Monitor . . . newest addition to the General Electric line of instruments developed to improve your quality control program.

By recording units accepted and rejected, the Continuous Sampling Monitor informs the inspector whether periodic sampling, or 100% inspection is required.

The AOQL (average outgoing quality limit) is thus insured by maintaining correct inspection techniques.

- **Ends "paperwork" by inspectors**
- **Reduces inspection time**

Look into the advantages of a Continuous Sampling Monitor. Try one on your production line and see how your quality control improves!

Contact your nearest G-E Sales Office, or write Sect. 687-77, General Electric Company, Schenectady, New York.

GENERAL ELECTRIC

687-77

SAFETY STANDARDS?

Keep them high with HOOD gloves!

MODEL 4710

Neoprene palm coated glove for general utility use . . . providing 7 – 8 times the wear of standard canvas work gloves.

MODEL 7702

Full Neoprene coated industrial weight 14½" gauntlet . . . 6" cuff . . . liquid proof . . . curved fingers . . . for all general industry.

In industry everywhere, companies have standards of safety for the protection of employees. And fortunately the average is high. But to have high standards is one thing – to keep them high is another! And for that reason, when safety is involved for the vital hands of employees, you owe it to your business *and* employees to investigate the advantages of Hood Industrial Work gloves. Only in this way will you find out, as so many in industry have, that hands in Hood gloves get *more* protection, are *more* efficient, get *longer* wear and *extra* comfort.

So to help keep your safety standards high, see the whole line of Hood Neoprene, Rubber or Plastic gloves, for every use in all jobs, in the new Hood glove catalog. Once your employees have tried them, you'll see why *efficiency* starts with *better* Hood gloves!

"Put your employee's hands into a safer glove"

Write today for the colorful new catalog showing the entire Hood line.

HOOD for NEW Safety PLUS

HOOD RUBBER CO. Watertown, Mass.

GET big truck advantages at small truck cost with YALE WORKSAVERS

SAVE **TIME AND SPACE.** Move giant loads up to 185 feet per minute—with safe, easy speed control. Utilize *all* storage and production areas.

SAVE **MUSCLE POWER.** Transport and lift capacity loads with a smooth flow of power that's easy on the operator, easy on the load.

SAVE **HANDLING COSTS.** Mechanize handling on low-load floors; in freight elevator operations; and in other areas where weight or space rule out big trucks.

PALLET WORKSAVER

TRACTOR WORKSAVER

PLATFORM WORKSAVER

HIGH LIFT PLATFORM WORKSAVER

YALE WORKSAVER Electric Hydraulic Lift Trucks are built for loads up to 6,000 lbs., and are ideally designed to accommodate skids or pallets. Their wide acceptance throughout industry is based on the YALE reputation for top performance in electric trucks of *every* kind.

GET AN EYE-OPENING DEMONSTRATION RIGHT IN YOUR OWN PLANT OR WAREHOUSE

Your YALE Representative will demonstrate the cost-cutting advantages of the rugged WORKSAVER line to you. All you have to do is name the time and place. Naturally, there is no obligation.

Be sure to ask about the famous WORKSAVER "package"—*truck, battery, battery charger.* The YALE Selenium Charger saves time by charging WORKSAVERS right on the job.

YALE is a registered trade mark of The Yale & Towne Manufacturing Co.

There's a Yale Worksaver to meet your every need

YALE & TOWNE

MAIL THIS COUPON TODAY

The Yale & Towne Manufacturing Co., Dept. 311
Roosevelt Blvd. & Haldeman Ave., Philadelphia 15, Pa.
Cutting costs with YALE WORKSAVERS interests me, too.

☐ Please have your local Representative call on me.
☐ Please send me a free copy of the new WORKSAVER Catalog.

Name.....Title.....
Company.....
Street.....City.....State.....
In Canada write: The Yale & Towne Manufacturing Co., St. Catharines, Ont.

YALE GAS AND ELECTRIC INDUSTRIAL TRUCKS • YALE HAND TRUCKS • YALE HAND AND ELECTRIC HOISTS

B-RIGHT-ON has it!

- Special Alloy Steel
- Fine Compact Grain
- Accurate Forming
- Uniform Quality
- Great Strength
- Right Temper
- Smooth Finish
- Close Tolerances

You'll find all the features you're looking for in Brighton Socket Screw Products.

Get the facts on Brighton Nu-Process and Uni-Quality! See your nearest mill supply house or write for detailed catalog.

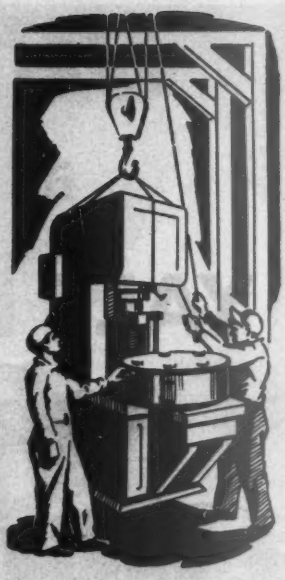
BRIGHTON
SCREW & MANUFACTURING CO.
Reading Rd. opp. Bear Creek, Cincinnati 2, O.

When **PRODUCTION** *hangs by a "Thread"...*

specify the wire rope that gives the greatest service. "HERCULES" (Red-Strand) *Preformed* spools more evenly—bends more smoothly. Handles more safely. Splices more easily. For fewer replacements are needed.

Engineered to reduce internal tension and twisting, "HERCULES" (Red-Strand) *Preformed* stays on the job—*in* the groove.

For uninterrupted production, there is only one right rope... be sure to select the correct size and type.



LESCHEN WIRE ROPE

Feel free to consult our Engineering Department at any time for specific recommendations. A. LESCHEN & SONS ROPE CO., 5909 Kennerly Ave., St. Louis, Missouri. Warehouses and branch offices in all principal cities.

Quality features packed into every inch of this outstanding white tape:

the best WHITE TAPE made at the lowest price yet

Snow-white blade with bold, legible, jet-black numerals and graduations. Graduated in 32nds for first 6 inches.

Sturdy die-cast case heavily chrome-plated, calibrated for quick reading inside and outside measurements.

Blade ½" wide made of finest high carbon steel—tempered—Bonderized—enamelled—baked.

Blade replaceable in seconds—without tools—without even opening case. And Evans replacement blades cost far less.

Exclusive Evans automatic brake gives smoother push-pull action with absolutely no "creeping" of tape into case.

Underside is white too. Mark with ordinary pencil, remove mark with flick of thumb.

Every "Evans White-Tape" is unconditionally guaranteed.

Check these list prices:
10-ft. $1.49 8-ft. $1.19 6-ft. 98¢

7847

***Evans* & CO. · ELIZABETH, N. J. MONTREAL, QUE.**

Prices higher in far west and Canada. Order from your tool distributor.

Makers of Evans Folding Rule and "The Folding Yardstick"

No shutdown, no slowdown and no bearings missed with Farval lubrication

WEBER bag machines produce paper bags at speeds up to 500 per minute. Machines are run continuously at high speeds up to 24 hours a day, and in all climates all over the world.

Good lubrication—vital to trouble-free operation—is provided by Farval Centralized Lubrication, which is offered as optional equipment on every machine.

According to the machine manufacturer:

"Centralized lubrication with Farval is a distinct aid to positive lubrication of hard-to-get-at places which previously required the machine to be shut down to reach the hidden bearings that were frequently missed entirely, either intentionally or due to an oversight.

"The closed bearings now used with the Farval system also practically eliminate any possible abrasive effects where undesirable conditions are encountered. Maintenance time has been cut to a minimum, since the entire machine can be lubricated while in operation. Bearing life has been increased tremendously. Oil and grease drippings have been eliminated since lubrication is clean and efficient with no waste lubricant to soil machine or paper bags."

Farval is the original (patented) Dualine system of centralized lubrication that has proven itself through years of service. The Farval valve has only two moving parts—is simple, sure and foolproof, without springs, ball-checks or pinhole ports to cause trouble. Through its full hydraulic operation, Farval unfailingly delivers grease or oil to each bearing—as much as you want, exactly measured—as often as desired. Indicators at every bearing show that each valve has functioned.

Write for Bulletin 25 for full details. The Farval Corporation, 3256 East 80th St., Cleveland 4, Ohio.

Affiliate of The Cleveland Worm & Gear Company, Industrial Worm Gearing. In Canada: Peacock Brothers Limited.

FARVAL—*Studies in Centralized Lubrication*
No. 115

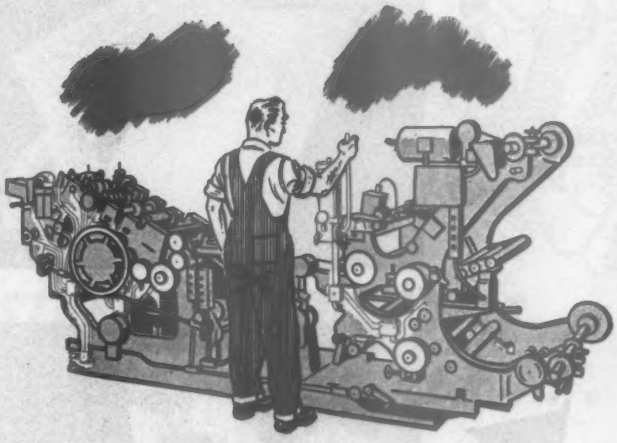


Illustration courtesy of H. G. Weber & Co., Inc., Kiel, Wis.

YOU MUSTN'T MISS—

INDUSTRIAL NEWS, BEGINNING ON THIS PAGE

TIMELY HINTS TO BETTER MANAGEMENT ON PAGE 268

QUOTES FROM INDUSTRY'S LEADERS ON PAGE 278

IDEAS TO STIMULATE YOUR THINKING, ON EVERY PAGE

Using pay envelope stuffers . . .

. . . employee magazine articles

. . . local radio programs

. . . bulletin board posters . . .

INDUSTRIAL NEWS

. . . Lyon Metal Goes After Scrap From Home

HERE'S THE STORY of a company that *really* went after scrap in the home. It used every kind of ammunition it could muster: radio, employee newspapers, bulletin boards, pay envelope. Results: a big scrap pile to help defense effort, and good publicity for Lyon Metal Products, Inc., Aurora, Ill., sponsor of the plan.

Once Lyon Metal had put across the need for the campaign to its employees, the rest was easy. The workers combed their own homes for every bit of idle metal, reported results to the company. Then a local scrap dealer made a collection, paying his going price of 1¢ a pound for ungraded scrap.

In the first few days more than 20% of the employees had turned up scrap—80,000 pounds of it, with more to come. And townspeople and newspapers were pitching in to help find more scrap in cellars, attics, and garages.

Turn the page

OVER 2% OF THE STEEL PRODUCED IS USED TO FASTEN THE REST TOGETHER . . .

Steel is a basic commodity. Upon our ability to produce steel, and more steel, rests the success of our rearmament program and the very security of our country.

Scrap is an important ingredient of new steel. More and more scrap will be required as production expands.

But what about the end products of steel—the machinery, the weapons, the vehicles, the thousands of products fabricated from steel? That's where fasteners are a MUST. Without fasteners most of the steel produced would be of little use.

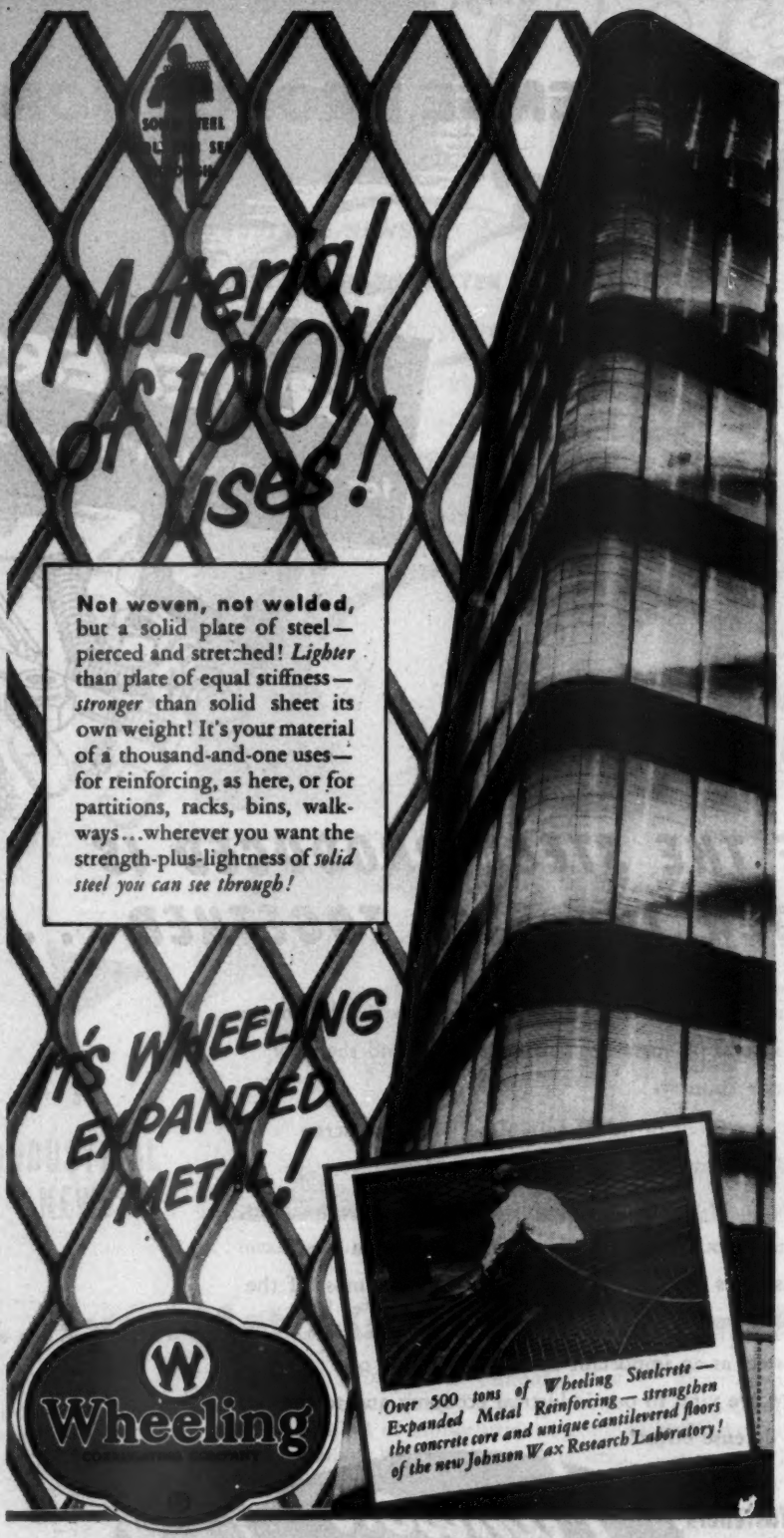
So when you think of steel as an important commodity, think of fasteners, too. *Both* are vital to our industrial economy and to the success of our defense effort!

The home of "quality controlled" fasteners

Lamson & Sessions

The LAMSON & SESSIONS Co. . • General Offices: 1971 West 85th Street • Cleveland 2, Ohio

Plants at Cleveland and Kent, Ohio • Birmingham • Chicago


Material of 1001 uses!
Not woven, not welded, but a solid plate of steel—pierced and stretched! *Lighter* than plate of equal stiffness—*stronger* than solid sheet its own weight! It's your material of a thousand-and-one uses—for reinforcing, as here, or for partitions, racks, bins, walkways...wherever you want the strength-plus-lightness of *solid steel you can see through!*
IT'S WHEELING EXPANDED METAL!
Over 500 tons of Wheeling Steelcrete—Expanded Metal Reinforcing—strengthen the concrete core and unique cantilevered floors of the new Johnson Wax Research Laboratory!
W
Wheeling

WHEELING CORRUGATING COMPANY

WHEELING, WEST VIRGINIA

Atlanta Boston Buffalo Chicago Columbus Detroit Kansas City
Louisville Minneapolis New Orleans New York Philadelphia Richmond St. Louis

YOU MUSTN'T MISS—

Begins on page 254

New Process to Plate Your Plastic Products

Are all your problems metal ones? You may save a lot of metal—and money—if you can use a plastic part and plate it.

A new process will electroplate a 0.003-in.-thick film of metal on Bakelite or Vinylite plastics. The plated object will be light weight and resist corrosion, abrasion, and heat. It will have a hard surface and take a very high polish.

Here's how they do it • First the object you want to plate—say it's a doorknob—is roughened. Then it's treated with a silver solution, to coat it with a 0.00001-in. bond of silver, for conductivity. Next the silvered knob is placed in a perforated plastic barrel and tumbled while immersed in a copper salt solution. The cathode contact is made through the bottom of the barrel. It's insulated from the solution by the high resistivity of the Bakelite.

Base coat of copper • After about 12 hours of tumbling, your doorknob will have a base coat of copper about 0.002-in. thick. On top of that a second metal can be plated, by using another electroplating barrel. You can have your doorknob polished—if it's a small one—by placing it with more of the knobs in a revolving barrel of steel shot and soap solution. Or if it's a large one, use a buffing wheel.

Comes in 12 colors • Metal can also be plated in 12 colors. If two different colors are coated on inner and outer surfaces of deep molded plastics, inlay effects are produced.

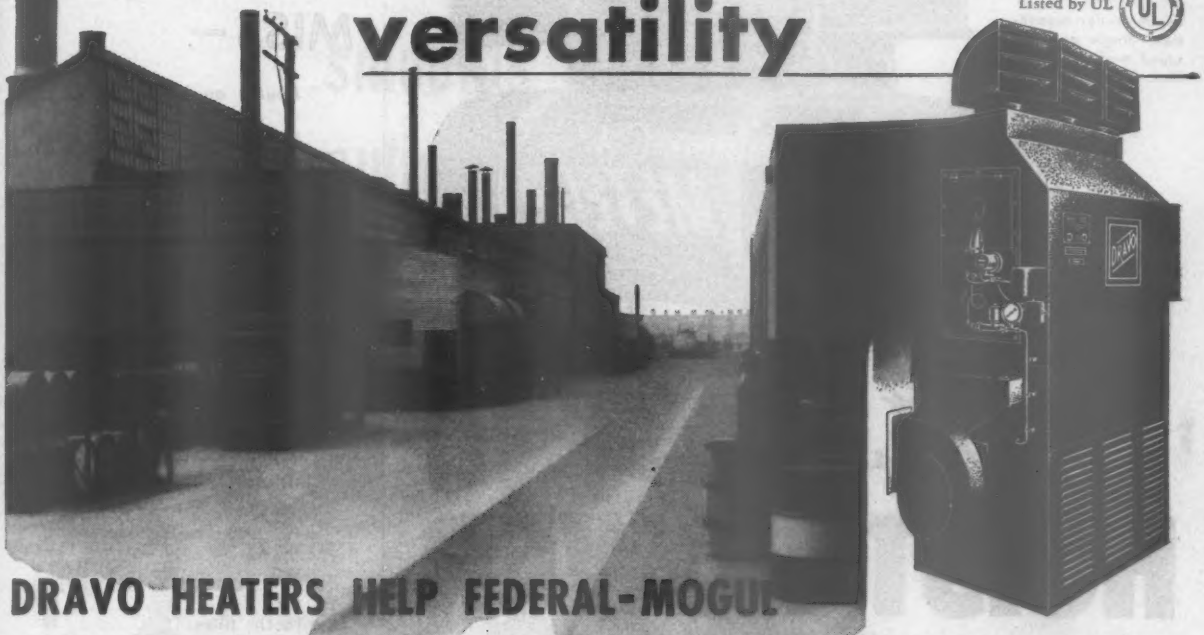
The Bakelite Company, a Division of the Union Carbide & Carbon Corporation, announced that the new plating process was developed by Plastiplate Company, Inc., South River, N. J.

Turn the page

ANOTHER EXAMPLE OF versatility

Approved by AGA

Listed by UL



DRAVO HEATERS HELP FEDERAL-MOGUL CORPORATION SOLVE A FOUNDRY VENTILATING PROBLEM

10 DRAVO *Counterflo* HEATERS . . .

- Keep atmosphere healthy
- Equalize pressure
- Provide constant temperature
- Increase employee morale
- Improve efficiency
- Step up production

At Federal-Mogul Corporation's non-ferrous foundry in Detroit, exhaust equipment removes 400,000 cu. ft. of contaminated air per minute to eliminate smoke, fumes, dust and excessive heat. During warm weather, make-up air comes from open windows and doors. But providing warm make-up air in winter was a difficult problem, for natural infiltration did not supply sufficient make-up air and what did enter chilled the working area.

Federal-Mogul solved this by installing 10 Dravo *Counterflo* Heaters at strategic locations in the foundry. Mounted horizontally or vertically, each heater, equipped with automatic modulating controls, produces 22,000 cu. ft. of even temperature air per minute. Heaters are shut down at night, but heat the building quickly next morning. In summer, the units are used for fresh air ventilating.

RESULTS: Normal atmospheric pressure maintained, facilitating exhausting of heavy gases; improved comfort; healthier working conditions; increased worker efficiency; improved morale, better production records!

VERSATILE DRAVO HEATERS ARE AT WORK IN MANY TYPES OF INDUSTRIAL AND COMMERCIAL APPLICATIONS

Dravo *Counterflo* Heaters are ideal for space heating and ventilating in warehouses . . . machine shops . . . railroad repair shops . . . process industries . . . stores . . . schools . . . churches . . . military installations.

DRAVO HEATERS OFFER YOU . . .

- Low initial cost . . . users report 30% to 60% savings.
- Concentration of heat at working level.
- Low Fuel consumption . . . burn gas or oil . . . easily converted.
- Automatic Control . . . on-off or modulating controls.
- Long service life, low maintenance . . . stainless steel combustion chamber.
- Mobility . . . easily moved to any location.
- Flexibility . . . where floor space is limited, can be wall-hung or suspended from trusses.

We will be glad to send you more information about heating and ventilating with Dravo *Counterflo* Heaters. Write today for Bulletin No. PQ-526-7

DRAVO CORPORATION

HEATING DEPARTMENT
Dravo Bldg., Fifth & Liberty Ave.
PITTSBURGH 22, PA.

ATLANTA • BOSTON • CHICAGO • CLEVELAND • DETROIT • NEW YORK • PHILADELPHIA • PITTSBURGH
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DRAVO

Manufactured and sold in Canada by Marine Industries, Ltd., Sorel, Quebec

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CM METEOR

● Heavy duty electric hoist for stationary, plain, geared or motor driven trolley suspension. Single and two speed models. Capacities: ½ to 5 tons.

Here's Plant Improvement that

Pays off in 3 Ways

HOIST POWER

LOWERS HANDLING COSTS — Picks up raw materials, or finished parts for assembly and moves them along for pennies in power and seconds in time.

ACCELERATES PRODUCTION — Takes the slowing up "lags" out of assembly line movement. One man precision "spotting". Speeds up handling in shipping.

IMPROVES PLANT MORALE — Saves the backs and muscles of men so that they may produce with "morning" efficiency in late afternoon. Aids in accident control.

Frankly, we don't know how many factories have cut costs by putting CM Electric Hoists on production jobs, but we *do know* they keep coming back for more and more Meteors and Comets. You couldn't ask for more convincing evidence of a product's usefulness to industry than a constantly growing demand.

CM Meteor and Comet advantages are fully described in the complete CM Catalog. Write us for a copy and the name of your local distributor.

CM COMET High speed, sturdy, portable electric hoist. One hand control. Plug in on single or 3 phase power line. Capacities: ⅛ to 1 ton.

CHISHOLM-MOORE
HOIST CORPORATION

Affiliated with Columbus McKinnon Chain Corporation

GENERAL OFFICES AND FACTORIES: TONAWANDA, N. Y.

SALES OFFICES New York, Chicago and Cleveland • Distributors Everywhere

YOU MUSTN'T MISS—

Begins on page 254

Productivity Rises in 19 Industries

All 19 manufacturing industries monitored by the Bureau of Labor Statistics in 1950 showed increases over 1949 in productivity—that is output per man hour. But keep this in mind: The industries covered are not necessarily representative of all industry. They're chosen only because accurate productivity statistics are available for them. The figures:

INDUSTRY	PRODUCTIVITY INCREASE 1950 OVER 1949
Beehive coke	22%
Synthetic fiber	19
Full fashioned hosiery	12
Paper & pulp	11
Beet sugar	10
Cement	9
Cigar	6
Clay sewer pipe	6
Brick, hollow tile	6
Glass container	5
Seamless hosiery	5
Confectionery	5
Ice cream	4
Condensed milk	4
Cigarette, pipe tobacco	3
Flour	3
By-product coke	2
Malt liquor	1

Reasons for the high productivity: mostly, says the Bureau of Labor Statistics, the general quickened industrial pace and large investments in plant and equipment.

U. S. Steel's Big Birthday Book

U. S. Steel is celebrating its 50th birthday with a 227-page autobiography. The handsomely illustrated, printed, and bound volume tells the story of a half century of U. S. steelmaking, company policy, personnel. Called *Steel Serves the Nation*, it was written by Douglas A. Fisher and was published in a limited edition.

Turn the page

"Tycol Avalon resists corrosion... smooths out hydraulic operations"

It's so! Tycol Avalon Oils make smooth, even hydraulic performance possible, no matter what the temperature. They provide maximum resistance to emulsification . . . permit continuous operation with minimum wear.

Tycol Avalon Oils have reduced hydraulic system costs in hundreds of operations . . . performing superbly and assuring minimum wear of pumps and packings. A selection of grades is available for every use.

Contact the nearest Tide Water Associated office for complete information. Call or write today.

TYCOL

INDUSTRIAL LUBRICANTS

Boston • Charlotte, N. C. • Pittsburgh
Philadelphia • Chicago • Detroit
Tulsa • Cleveland • San Francisco

TIDE WATER ASSOCIATED OIL COMPANY

17 BATTERY PLACE · NEW YORK 4, N. Y.

SEND FOR A FREE COPY OF "TIDE WATER ASSOCIATED LUBRICANIA"

It pays to put all your new machinery on ISOMODE* PADS

1. For faster installation
2. For quieter plant
3. For less maintenance

That's right—vibration absorbing Isomode* Pads are the easy way to save time, labor and operating costs with new equipment and in new plants.

Engineered by vibration specialists, these 5/16" pads have proved their ability to absorb disturbance normally transmitted to floor—even shocks from large punch presses! Locate machines *anywhere*. Usually no need for bolting. Simply cut to size and install under legs or base. One square foot of Isomode Pad has the capacity for 4 tons of machines!

And the results are plain to see: Less machine maintenance, less noise, reduced building damage.

Isomode Pads are made of Neoprene to resist oils, water, aging. Write for full facts and learn how little they cost.

Reg. U.S. Pat. Off

THE MB MANUFACTURING COMPANY, INC.
1080 State Street, New Haven 11, Conn.

Please send bulletin No. 405 containing more information on Isomode Pads and how to install them easily and quickly.

NAME.. .....TITLE.....

COMPANY.....

ADDRESS.....

YOU MUSTN'T MISS—

Begins on page 254

Are We Neglecting Basic Research?

WASHINGTON—Efforts of Sen. Paul H. Douglas (D., Ill.) to get some money for the National Science Foundation has focussed attention again on the fact that government-industry support of basic research—long-term gain—is being neglected for support of applied research—quick pay-off.

Here's what Douglas wants · Sen. Douglas proposes the following changes in appropriations for the coming year:

- Cut 5% ($70-million) from the proposed Defense Department research fund ($1.47-billion.)
- Give one-fifth ($14-million) of the $70-million to the National Science Foundation for basic research. That's the figure asked for by the N. S. F. But it's only been allotted $300,000.
- Result: Taxpayers would save $56-million, and, according to Sen. Douglas, "we shall not fall behind Russia in our scientific discoveries."

How N. S. F. would use it · The National Science Foundation plans to use $5-million of its $14-million budget (if Sen. Douglas' suggestion is carried) to support graduate and post-doctorate fellowships in the technical fields. That's going to help relieve the shortage of top technical minds. The rest of the funds will go straight to basic research. If Congress fails to give support to "important areas of . . . research" warns the National Science Board, governing body of the N. S. F., our future security and welfare would be threatened.

Scientists blame Congress, public · Our research leaders have called for more basic research. Scientists blame Congress, and the public indirectly, for our lag in that respect. They feel that neither Congress nor the public

Turn the page

pennsylvania company solves TOUGH water hose problems

Splattering food juices in a large Pennsylvania Cannery quickly deteriorated ordinary washdown hose. The hose covers turned flabby and scraped off on concrete floors. The exposed carcasses wore out prematurely with the destruction accelerated when workmen kinked the hose to control flow. All this cost time and money.

Could the problems be solved?

Republic's local Distributor thought so, and suggested a test run with Republic's Fairway Water Hose . . . no custom-built hose necessary.

That test, begun 15 years ago, is still going on because the **hose never wore out!!!** The workmen are more efficient with the easy-handling Fairway Hose, and the company (now a confirmed Republic customer) is tickled to death since eliminating hose repair and replacement costs

Fairway Hose, available in all standard sizes in 50 ft., 100 ft. or long production lengths on reels or in bales, is just one of the many Republic Rubber Products designed for rugged duty in your plant.

For a free analysis of your requirements, simply mail your request to Republic Rubber Division, Youngstown, Ohio.

Your Corrugated Containers can have Nine Lives, too!

STAPLE AND RE-STAPLE *for* USE AND RE-USE

BOTTOMING CONTAINERS faster and better with a Bostitch Model F stapling machine . . . foot or motor operated. A low-cost investment.

1. **STAPLED CONTAINERS LAST LONGER,** because Bostitch staples make stronger joints, yet containers are not damaged when "unstapled" for re-use.
2. **STAPLED CONTAINERS ARE EASIER TO OPEN,** because Bostitch staple removers quickly release staples, leaving container intact for re-use.
3. **CONTAINERS REPAIRED BY STAPLING** are almost as good as new ones, because Bostitch stapling machines make patches strong and neat.

WHATEVER THE SIZE AND SHAPE of your corrugated containers, you'll find Bostitch stapling machines and staples that will *fasten them better and faster with wire.* Use the coupon below to get the latest tips on saving time, costs and corrugated board in your shipping room.

RE-USING CONTAINER MATERIALS to make up special sized cartons for miscellaneous shipments — with Bostitch stapling pliers.

REPAIRING USED CARTONS with a heavy-duty Bostitch Model ½C stapler. Drives staples up to 9/16" in length. Choice of 5⅜" or 10" throat.

REMOVING STAPLES quickly and easily with Bostitch G-7 staple remover without damaging the carton. Lengthens re-use life.

PLEASE ATTACH THIS COUPON TO YOUR LETTERHEAD

BOSTITCH, 400 Mechanic Street, Westerly, R. I.

In the interests of saving corrugated board, please send me a free copy of your folder "How to Save Time and Money in 12 Important Shipping Room Operations."

Name ..... Title .....

Firm .....

Street .....

City ..... Zone ..... State .....

BOSTITCH®

fastens it better, AND FASTER, with wire

ALL TYPES OF MACHINES FOR APPLYING STAPLES

ALL TYPES OF STAPLES APPLIED BY MACHINES

YOU MUSTN'T MISS—

Begins on page 254

really understands the need for basic research—that you couldn't design an atom bomb until you knew more about the atom—despite repeated statements that our production of radios, atom bombs, and rockets has been made possible by foreigners.

Industry agrees · J. Albert Woods, president of Commercial Solvents Corporation, stated that although the chemical industry spends vast sums for research (about 3% of its sales dollar), its ends are immediate. Money, therefore, must be directed where there is some chance of bringing a product into commercial production within a reasonable length of time. That's not basic research, by a long shot.

Where research funds go now · Within the past year, more and more funds have been poured into applied research. The need, of course, is to get results as fast as possible. There is, for example, the 11-member Science Advisory Committee which had been established within the Office of Defense Mobilization to advise the President and Mobilizer Charles E. Wilson. In contrast to the National Science Foundation, the committee will concern itself chiefly with "basic" scientific advances of assistance to the defense effort. That means immediate use.

Research and Development Board Formula · The Department of Defense does recognize—in part—the need for basic research. Last January its Research and Development Board approved a formula to guide the military services in support of basic research. Total Department of Defense outlays for basic research—mostly "farmed out" to non-governmental institutions—must be at least $30-million a year. That policy is to run three years, then be reviewed by the board.

Turn the page

STILL THE ALL-AMERICAN FIRST

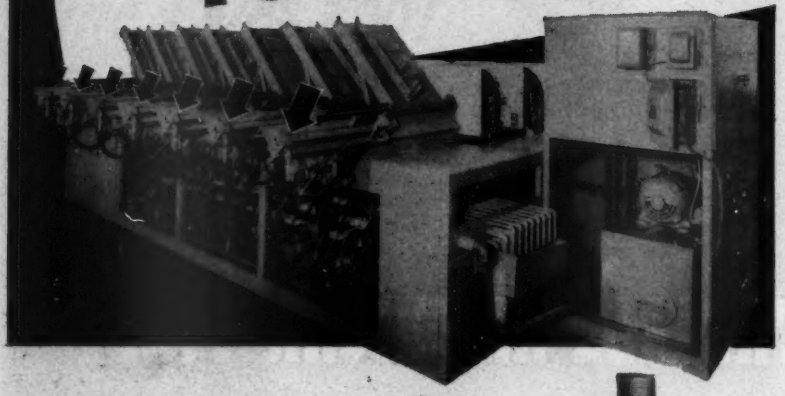
Master Gearmotors have given more millions of hours of satisfactory service in the field than all other makes . . . COMBINED.

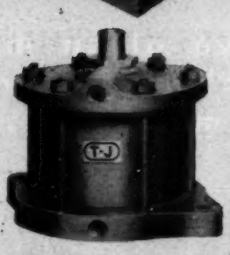
MASTER GEARMOTORS

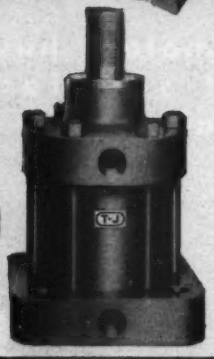
THE MASTER ELECTRIC COMPANY · DAYTON 1, OHIO

Job File No. 3259

Feeds Automatically WITH T-J CYLINDERS





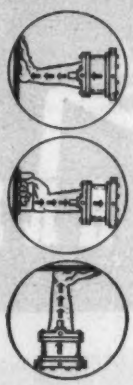


T-J Hydraulic Cylinders furnish efficient, automatic "push power" for feeding devices in this new Ajax-Northrup induction forge heating equipment.

This unit—manufactured by Ajax Electrothermic Corp., Trenton, N. J.—automatically heats steel forging stock in sizes ranging from 1 to 4 inches (rounds or squares) at 2250°F. at rate of 7500 to 8500 lbs. per hour. Has space for 8 heating stations . . . each with *hydraulically operated billet feeding devices employing T-J Cylinders.* These cylinders also eject heated bars automatically. Induction heating with this equipment results in uniformity of successive billets fed to the forge—thus controlling quality of finished forgings and reducing rejects.

Do you have a tough job in power movement—pushing, pulling or lifting? Let T-J help you *simplify machines, save labor* and *cut costs* by using T-J Air or Hydraulic Cylinders! Many standard sizes and styles . . . cushioned or non-cushioned . . . 100 lb. or 50,000 lb. Precision-built, long life. Write for more information. The Tomkins-Johnson Co., Jackson, Mich.

FOR POWER MOVEMENT IN ANY DIRECTION



100 LBS. or 50,000 LBS.

35 YEARS EXPERIENCE

TOMKINS-JOHNSON

RIVETORS · AIR AND HYDRAULIC CYLINDERS · CUTTERS · CLINCHORS

T-J

YOU MUSTN'T MISS—

Begins on page 254

New Zealand Again Rejects Socialism

MELBOURNE — New Zealanders are *sure* they don't want socialism. That's apparent from the final figures in New Zealand's recent elections. The country gave socialism an extended trial. Then about 1½ years ago the voters rejected the Labor government (FACTORY, February, 1950). Now New Zealand has underlined that choice by giving a landslide victory to elements supporting private enterprise ideas.

In a way, the people's verdict has vindicated the government's firm resistance to the rule of force in industrial unrest. In this field the government was strongly supported by people belonging even to Labor parties.

How it started · After the late 1949 election, militant trade unions declared war on Prime Minister Sidney G. Holland's government. A waterside strike paralyzed a good part of New Zealand's economy and affected, most of all, the poorer part of the population. Throughout the strike the government made it clear that no compromise would be considered. The leaders of the strike thought otherwise. Their disappointment came pretty quickly, and more moderate strikers went over to new trade unions. The strike was prolonged, costly, and bitter, but it ended in the government's full victory. And Mr. Holland, instead of ruling until the end of the previous parliament, decided to seek the people's verdict on his conduct of industrial relations. The verdict was clear.

Emphatic rejection · It was a most emphatic rejection of socialism. Holland's government is now one of only seven in New Zealand's history to hold such a great majority. The people were not misled by an extensive campaign

Turn the page

Tape it with Behr-cat

Those neat, sparkling two-tone finishes are easy when BEHR-CAT No. 111 Tape masks the color separation. This thin tape sticks tight and holds paint build-up down to a minimum. When stripped off, BEHR-CAT Tape comes clean and leaves a fine, smooth edge. It s a time saver and output booster for any masking job. Use it, too, for stenciling, protecting, sealing, reinforcing, and holding loose parts in assembly. BEHR-CAT Tape is a well-balanced, all-purpose tape that is fast winning friends for all these jobs.

YOUR SPECIAL TAPE PROBLEM is welcomed at BEHR-MANNING. Our fully staffed laboratories are at your service. Put us to the test. Write today. Address Dept. F-11

BEHR-MANNING

division of NORTON Company

▲ COATED ABRASIVES
▲ SHARPENING STONES
▲ PRESSURE-SENSITIVE TAPES

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Canada: Behr-Manning (Canada) Ltd., Brantford, Ont.
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CARBOLOY HEVIMET is ideal for building containers for radioactive materials. With it, safer, less bulky containers can be made, because Hevimet is machinable, strong . . . gives 1.5 times more gamma ray protection than lead.

New metal that stops "hot" atoms . . . cold!

Handling "hot" atomic material is tricky, troublesome business in atom plants, hospitals and industrial laboratories.

But the job can be safer, easier now . . . with Carboloy Hevimet. A smaller amount of this man-made metal affords more radioactive ray protection than lead. Eliminates many atomic shielding and shipping problems with its high density in minimum bulk. Also simplifies design and fabrication because of its machinability, dimensional stability and great tensile strength.

Hevimet is only one of the exceptional Carboloy created-metals. Others include Alnico Permanent Magnets for lasting magnetic energy and Carboloy Cemented Carbides for cutting, forming and wear resistance.

PIONEERS IN METALS

Is there a spot where these versatile metals can help you unsnarl a production bottleneck? Speed up a process, perhaps? Or lower costs? Or improve a product?

Get in touch with a Carboloy engineer . . . for all the practical knowledge available on these three created-metals. Look to Carboloy metallurgists, too, for *continued* pioneering in even broader fields of use for these and other created-metals.

Why not write about your needs?

"Carboloy" is the trade-mark for the products of Carboloy Department of General Electric Company.

CARBOLOY

DEPARTMENT OF GENERAL ELECTRIC COMPANY
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CARBOLOY CREATED-METALS

ALNICO PERMANENT MAGNETS for lasting magnetic energy

CEMENTED CARBIDES for phenomenal cutting, forming, wear resistance

HEVIMET for maximum weight in minimum space, and for radioactive screening

FIRST IN MAN-MADE METALS FOR BETTER PRODUCTS

YOU MUSTN'T MISS—

Begins on page 254

of socialist promises to outbid the conservatives in price cuts and tax remissions. Neither were they influenced by Labor's policy, which conspicuously soft-pedalled socialism. In fact, socialist leader Walter Nash said he saw little scope for more nationalization.

In spite of everything, the electors in democratic and free elections expressed themselves against state enterprise, against controls, and against any trammeling of individual liberties.

What conservatives did · The conservatives proved another interesting thing. They did not condemn wholesale or abolish the social security benefits. In many respects they have improved them and in some cases they have extended them. They do not regard them as being socialistic or unhealthy for free enterprise.

How Big Is Big Business?

What's the biggest U. S. corporation? And how many subsidiaries does it have? The answers to those questions and more of the same are in a new Federal Trade Commission publication, *A List of 1000 Large Manufacturing Companies*. (Superintendent of Documents, Washington. $1). Based on 1948 statistics, it lists subsidiaries and affiliates of 1000 large manufacturing companies. Here's a sample of the kind of facts it will give you:

The biggest U. S. corporation: Standard Oil of New Jersey. Assets: $3,526,043,000. Number of subsidiaries and affiliates: 322.

Average number of subsidiaries in each of nation's 100 largest companies is 35.

FTC prepared the list for defense agencies. Some legislators complained the agencies aided monopoly by granting certain loans, tax benefits, allocations.

Turn the page

GET SET TO SAVE MAN-HOURS

WITH A ZIP

HANDLE IT "thru-the-air"!

In thousands of plants the Zip-Lift is saving millions of hours — letting workers make the most of their time and skills — with the effortless speed of "thru-the-air" handling. Along production lines, beside machine tools, on shipping platforms — wherever loads are handled frequently — your workers can merely press buttons, and the Zip-Lift does the rest.

And remember — there's no substitute for Zip-Lift quality and reliability.

You pay so little more for ADDED VALUES like these:

SAFER Full magnetic control with current reduced to 110 volts at push button. Plugging crane type limit switch. Large double brakes. For *your* protection, P&H never stretches a motor rating.

LIFETIME CONSTRUCTION Precision-built — shaved gears run in oil — grease-sealed bearings — fully enclosed.

Help defeat inflation. Demand economy in government spending. Write your congressmen.

P&H

ELECTRIC HOISTS
4525 W. National Avenue
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HARNISCHFEGER CORPORATION

SEE YOUR ZIP-LIFT DEALER, or write us for Bulletin H-20-—it's filled with time-saving ideas for you.

HOISTS • OVERHEAD CRANES • HOISTS • ARC WELDERS AND ELECTRODES • SOIL STABILIZERS • CRAWLER AND TRUCK CRANES • DIESEL ENGINES • CANE LOADERS • PRE-ASSEMBLED HOMES

Can any of these free services help you speed defense production?

New York State offers these aids to defense manufacturers and suppliers

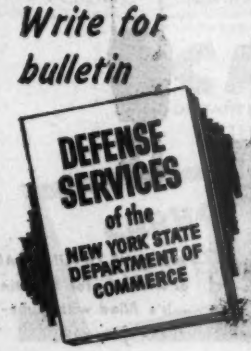
1. Help in Locating Subcontractors. The New York State Department of Commerce, through its "Industrial Preparedness Survey," can supply complete data on plants and equipment suitable for production of specific defense items. A prime contractor can speedily locate the subcontractor he needs.

2. New Plant Site Location. To help you establish new plants or expand current operations, the Department will be glad to recommend appropriate locations available within the State. Information on labor, raw materials, power, water, fuel and transportation will aid your decision. Inspection trips are arranged confidentially.

3. Office in Washington. A New York State office is maintained in the nation's capital to help New York businessmen. This office sets up meetings with the proper personnel; provides information on government agencies; keeps abreast of current regulations and restrictions; aids in preparing applications and other papers needed to carry on business with Federal agencies.

4. Information on Current Federal Purchasing. As part of its service to businessmen, New York State screens notices of Federal procurement opportunities and circulates procurement information to firms within the State.

Write for bulletin



New York State Department of Commerce
Room 112, 112 State St., Albany 7, N. Y.

Please send me a copy of your free bulletin "Defense Services of the New York State Department of Commerce."

Name _____

Position _____

Company _____

Street _____

City _____ *State* _____

YOU MUSTN'T MISS—

Begins on page 246

TIMELY HINTS

What's Your Score on Recreation?

Are you getting as much benefit from your industrial recreation set-up as you should? If you want to make sure, you can check yourself against this list. It's imported. It was drawn up as a result of a survey of recreation in Canadian industries by the Ontario Department of Education. Here are the characteristics of a good program, the department says:

1. The goal of the recreation program should be "all interests, all participating."
2. Management must supply good will, good intentions, some support.
3. The program should begin with a few well-organized, well-run, well-attended activities, and grow from there.
4. Participation must be open to all employees, including management.
5. Program should be run by employees themselves—even if a paid director promotes and coordinates it.
6. Management should always be represented in the organization that runs the program.
7. Frequent elections should be held so that as many as possible hold executive posts in the organization.
8. The organization should concern itself only with recreation. Company disputes and policies are out.
9. The program should be run under a clearly defined company policy and financial arrangement.

Turn the page

American Blower . . . a time-honored name in air handling

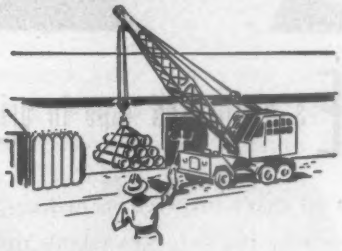
Buffalo, too, has a conveniently located American Blower Branch Office to provide you with data and equipment for air handling. You can reach American Blower in Buffalo by calling Washington 2668. In other cities, consult your phone book.

BETTER FABRICS . . .

Fine yarn filaments, strong plump fibers —these are the marks of a good textile mill. And, in many top mills, you'll find American Blower equipment helping in the control of inside temperature and humidity. For example, several of our large AHS Fans were ordered recently by an important Southern mill. The thing operators like about these fans is their non-overloading power characteristics and their remarkable efficiency over a wide range (which saves them money). May we help you with a similar problem?

HOSPITAL COMFORT . . .

A new Veterans' Hospital is going to be mighty comfortable—at least when it comes to ventilation. Reason—34 American Blower Sirocco Fans which were recently installed. These fans deliver more air per revolution than any other type of fan, operate at lower tip speeds, are unusually quiet, save power and require only a minimum of space for installation. For the best in air handling equipment, call American Blower.



POWER SAVER . . .

If you're concerned with power transmission, you'll want to know about our Gyrol Fluid Drives. Developed originally for use with mechanical draft fans, Gyrol Fluid Drives are today widely used in industry. They offer three important advantages—smoother acceleration, overload protection and substantial power savings. One company uses Fluid Drives on a crane that picks up acetylene tanks. Before they were installed, the tanks got such a violent swing from the quick start they would often damage building walls. Since using the Fluid Drives, they've had no trouble.

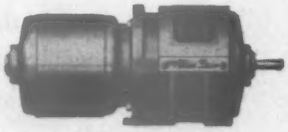
MAY WE SERVE YOU?

American Blower heating, cooling, drying, air conditioning and air handling equipment can do much toward improving comfort and efficiency in business. For data, phone or write our nearest branch office.

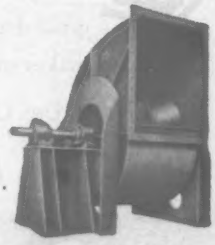
Unit Heaters

Ventura Fans

Air Conditioning Equipment



Gyrol Fluid Drives



Industrial Fans

AMERICAN BLOWER CORPORATION, DETROIT 32, MICHIGAN
CANADIAN SIROCCO COMPANY, LTD., WINDSOR, ONTARIO
Division of AMERICAN RADIATOR & Standard Sanitary CORPORATION

YOUR BEST BUY AMERICAN BLOWER AIR HANDLING EQUIPMENT

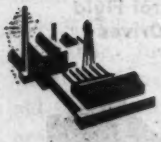
Serving home and industry: AMERICAN-STANDARD • AMERICAN BLOWER • CHURCH SEATS • DETROIT LUBRICATOR • KEWANEE BOILERS • ROSS HEATER • TONAWANDA IRON

Orange Core makes your shipping dollars go further

ORANGE CORE a standard tape in price only

If you could *see* all that's involved in making gummed tape, you'd *know* why the only STANDARD thing about Orange Core is its low price.

For Orange Core enjoys a unique advantage. Every inch on every roll sticks with the same bulldog grip because the men who make Orange Core control *all* its ingredients. Unlike some manufacturers, Hudson makes its own kraft and applies its own specially formulated adhesive—all under one roof, one laboratory control.



This uniform, high quality makes Orange Core popular. And popularity is a basic reason for its low cost. Only great demand could boost production to the volume that makes such pricing possible.

Use Orange Core yourself to understand why it's...

the world's largest selling gummed tape!

ORANGE CORE
GUMMED SEALING TAPE

HUDSON PULP & PAPER CORP., Dept. 4-L, 505 Park Ave., New York, 22, N. Y.

YOU MUSTN'T MISS—

Begins on page 254

125 Companies View Excess Profits

Most of the executives questioned in a survey of 125 manufacturing companies agreed that the excess profits tax:

1. Has cheapened the dollar, increased the advantages of spending, made sound business judgment difficult.
2. Would not greatly affect competitive standing, since all are in same boat.
3. Would cause little change in pricing, inventory policies.

Salvaging the tax dollar · Almost half of the executives surveyed expect some advantages from the tax law. How? By increased spending on items—research and development, advertising, pensions—that salvage as much of the tax dollar as possible.

Almost a third said that the tax would either cancel projected increases in dividend rates or reduce dividends.

Some executives expect to raise needed capital through borrowing. They get a tax deduction on interest paid, a tax credit for part of the borrowed funds as "invested capital allowance."

The National Industrial Conference Board made the survey.

Lignite to Power Smelting Plant

There's something different about Aluminum Company of America's projected $80-million aluminum smelting plant at Rockland, Tex. It's going to be the first plant of its type to use burning lignite — low-grade bituminous coal — to generate electric power. Reason: Alcoa hopes use of lignite will reduce costs to point where Rockdale plant can compete with those using hydroelectric or natural gas generated power.

Turn the page

Can You Use It?

The experience of handling 3800 Sheet Metal Subcontracts during World War II is at your command at LYON

MAIL COUPON FOR THIS BROCHURE • IT TELLS ALL

LYON METAL PRODUCTS, INCORPORATED
1112 Monroe Avenue, Aurora, Illinois

Please send me a copy of LYON'S DEFENSE PRODUCTION BROCHURE which explains the 4 big reasons why Lyon can handle sheet metal subcontracts better.

NAME _____ TITLE _____

COMPANY _____

ADDRESS _____

CITY _____ STATE _____

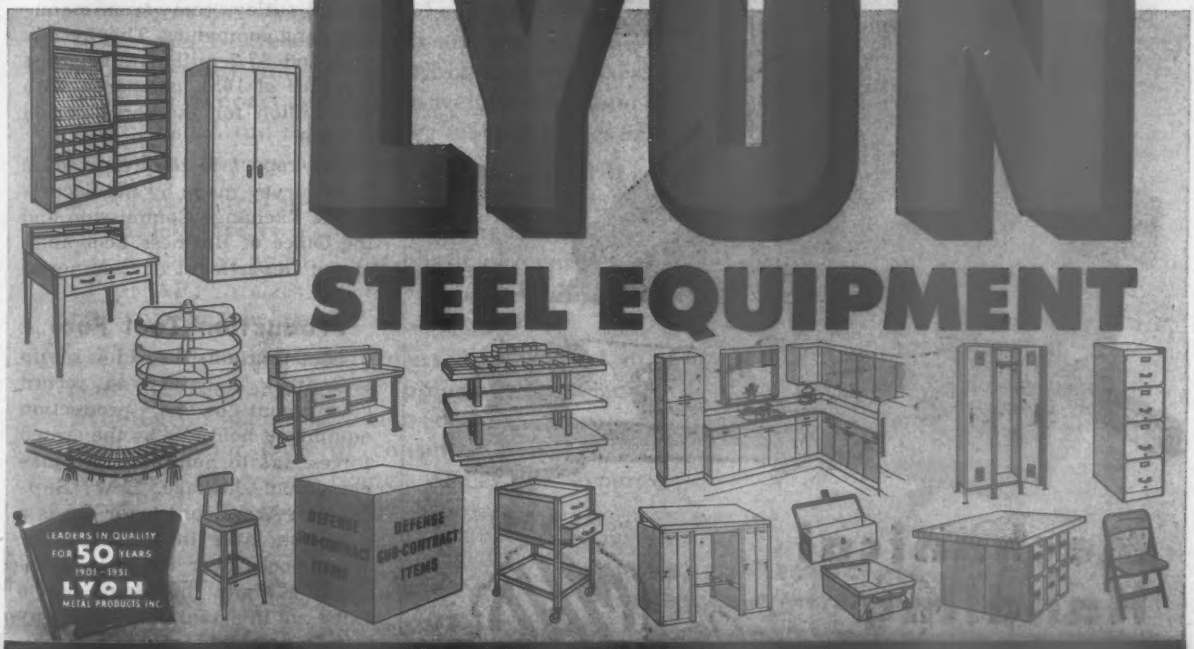
2 STRATEGIC PLANTS . . . AURORA, ILL., AND YORK, PA.

LYON METAL PRODUCTS, INCORPORATED

General Offices: 1112 Monroe Avenue, Aurora, Illinois

LYON

STEEL EQUIPMENT



A PARTIAL LIST OF LYON STANDARD PRODUCTS

- Shelving
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- Stools
- Bin Units
- Kitchen Cabinets
- Cabinet Benches
- Storage Cabinets
- Welding Benches
- Conveyors
- Bar Racks
- Tool Boxes
- Parts Cases
- Economy Locker Racks
- Flat Drawer Files
- Tool Room Equipment
- Wood Working Benches
- Display Equipment
- Drawing Tables
- Revolving Bins
- Hanging Cabinets
- Filing Cabinets
- Folding Chairs
- Work Benches
- Bench Drawers
- Service Carts
- Sorting Files
- Drawer Units
- Hopper Bins
- Tool Stands
- Shop Boxes
- Tool Trays
- Shop Desks

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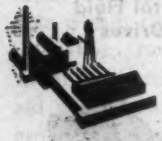

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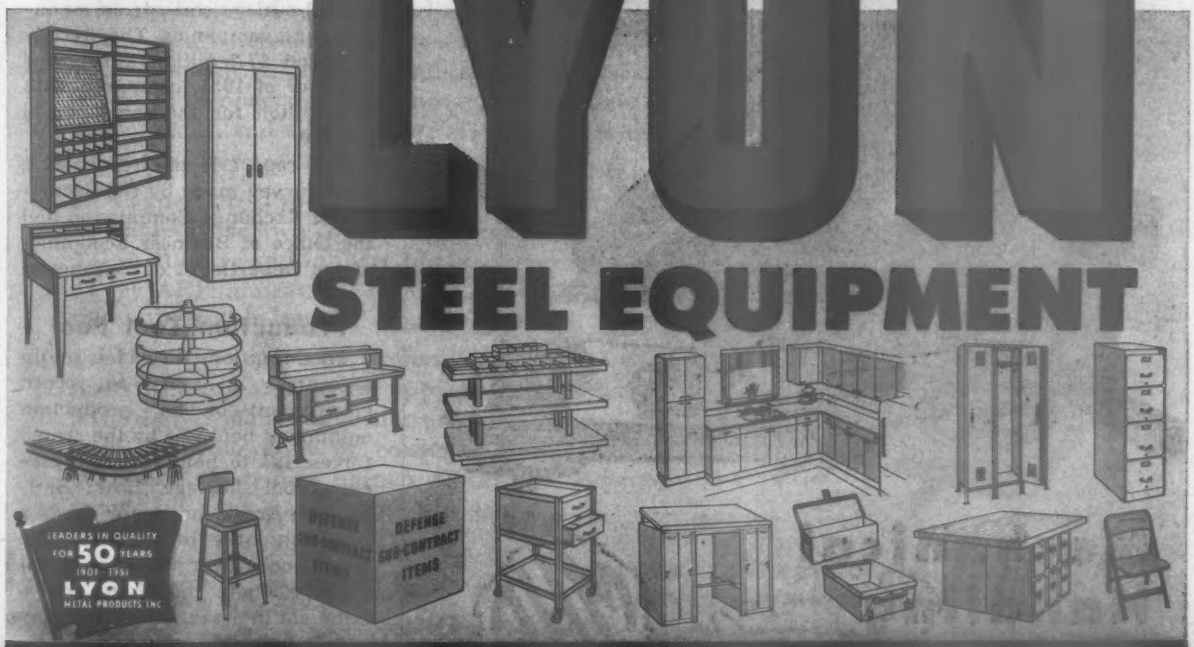


A PARTIAL LIST OF LYON STANDARD PRODUCTS

• Shelving	• Kitchen Cabinets	• Conveyors	• Economy Locker Racks	• Display Equipment	• Filing Cabinets	• Service Carts	• Tool Stands
• Lockers	• Cabinet Benches	• Bar Racks	• Flat Drawer Files	• Drawing Tables	• Folding Chairs	• Sorting Files	• Shop Boxes
• Stools	• Storage Cabinets	• Tool Boxes	• Tool Room Equipment	• Revolving Bins	• Work Benches	• Drawer Units	• Tool Trays
• Bin Units	• Welding Benches	• Parts Cases	• Wood Working Benches	• Hanging Cabinets	• Bench Drawers	• Hopper Bins	• Shop Desks

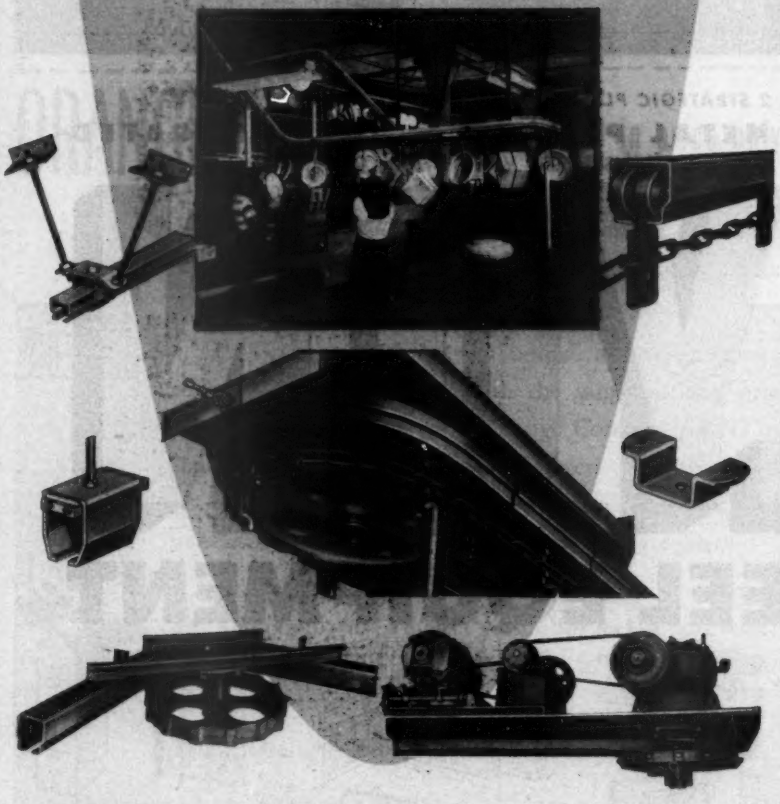
A Packaged Conveyor

you can erect yourself

Here is a complete overhead, power driven, monorail conveyor for light and medium loads—the MHS Junior Monoveyor.

You make your own layout to meet whatever manufacturing, transportation and storage requirements you have. Order the necessary components and erect it yourself. No lost time—no unnecessary expense.

Write for Bulletin JM-1 for complete details on components and layout.



Mechanical Handling Systems, Inc.

4608 NANCY AVE. • DETROIT 12, MICH.

Offices in Principal Cities

YOU MUSTN'T MISS—

Begins on page 254

There's More There Than Meets the Eye

Packaging is big business—especially in a war economy. If you don't believe it, take a look at what happened before:

During a single year (1944) of World War II, packaging ate up:

—half the lumber production.

—more than half the paper and paperboard production.

—quarter of the tin production.

The statistics came from the Federal Specification Board's Technical Committee on Packaging.

Peak Plant Outlays Expected in 1951

If reduced allocations don't stop expansion plans, projected capital outlays for 1951 are put at $24.8-billion. That's more than $5-billion over the previous high set in 1948.

About half of the expected capital outlays come from manufacturing companies. They're due to spend $7.2-billion during the last half of 1951, compared with $4.8-billion for the same period in 1950.

The report is the result of a joint survey made by the Securities & Exchange Commission and the Office of Business Economics of the Department of Commerce.

Production Tool Pool

The Munitions Board has set up a central inventory to record government-owned production equipment held idle by the armed forces. It's to help ease the machine tool shortage. How? Suppose an Army contractor needs a precision lathe in a hurry. The Army looks over the central inventory, finds the Navy has a lathe not in actual use. The Army orders it. In this way, any service can tap the reserves of others for its own needs.

Turn the page

Wagner
TRANSFORMERS
...the choice of leaders in industry

Reduce Power Distribution Costs
(Save copper too!)
with Wagner Dry-Type Transformers

You can save money, save copper, and improve voltage regulation by bringing the *right* voltage to the load center with Wagner Dry-Type Transformers. They are safe to use—without fireproof vaults or other special protection—even where fire hazards are present. They provide steady voltage with minimum line losses. They are compact and light in weight—economical to install and easy to move when changes in plant facilities are necessary.

Wagner Dry-Type Transformers are available in single-phase, two coil units (Type AE) in sizes 1.0 to 200 kva and in three-phase, two coil units (Type AP) in sizes 3.0 to 300 kva. Both types 600 volts and below.

These dry-type transformers can be used in many lighting and power applications. Bulletin TU-90 gives many suggestions that you can use—write for your copy or consult the nearest of Wagner's thirty-one branch offices for expert advice on your transformer problems.

TYPE AE

TYPE AP

WAGNER ELECTRIC CORPORATION
6412 Plymouth Ave., St. Louis 14, Mo., U.S.A.

Wagner Electric Corporation
1891 WE 1951

ELECTRIC MOTORS • TRANSFORMERS • INDUSTRIAL BRAKES
AUTOMOTIVE BRAKE SYSTEMS – AIR AND HYDRAULIC

BRANCHES IN 31 PRINCIPAL CITIES

TU-10

Control Costs with TOLEDO

On your scale material becomes money!

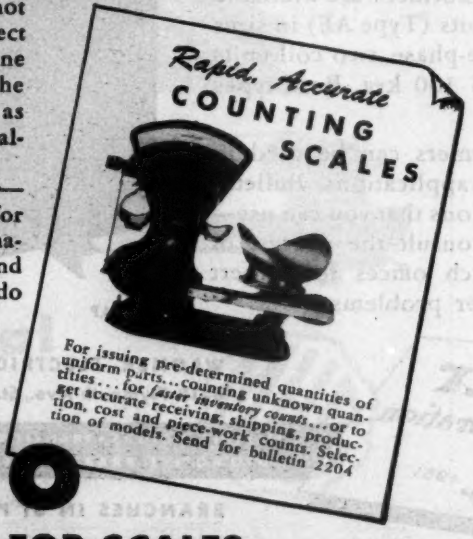
PRINTWEIGH STOPS ERRORS . . . Provides printed weight records—at the instant of weighing—assuring that the accurate indication of the Toledo dial will reach your accounting records without chance of human error.

Modern Toledos meet your needs today for *rapid, accurate* scales in all phases of production . . . to help you *control costs!*

These are the scales backed by Toledo's half-century of experience in Research and Engineering that has produced 80% of the major advances in scales during this time.

Toledo engineering has not only specialized in the direct design of weighing machine mechanisms, but also in the many associated fields such as electronics, plastics, metallurgy, optics.

Check your needs *now*—select Toledo equipment for vital jobs in guarding materials and costs! Sales and service in 200 cities. Toledo Scale Company, Toledo 1, Ohio. We will be very glad to send catalogs.


Rapid, Accurate
COUNTING SCALES
For issuing pre-determined quantities of uniform parts...counting unknown quantities . . . for *faster inventory counts*...or to get accurate receiving, shipping, production, cost and piece-work counts. Selection of models. Send for bulletin 2204

TOLEDO

HEADQUARTERS FOR SCALES

YOU MUSTN'T MISS—

Begins on page 254

Mechanical Watchman Keeps Out Intruders

A San Francisco electronics company recently eliminated eight guards through the use of a new mechanical plant protection system. It's called Photo Identi-Key, said by its inventor to offer defense plants maximum security with minimum guard force.

Photo Identi-Key works something like a time clock on a turnstile. The worker puts his card in a slot. If it's a valid pass the turnstile opens. If it's not, a guard will come on the double.

Secret of the system · Valid passes have tiny magnets hidden in them. They match a similar system of magnets in the turnstile to open it; phony cards set off an alarm. Stolen cards, which come to mind as a problem, can be handled by using the passes in conjunction with a series of push-buttons. You have to press the right one at the same time you put your card in the slot.

Defense Identification Service, Inc., a new subsidiary of Bowser, Inc., sells the device.

Plant Civil Defense Needs 20% of Workers

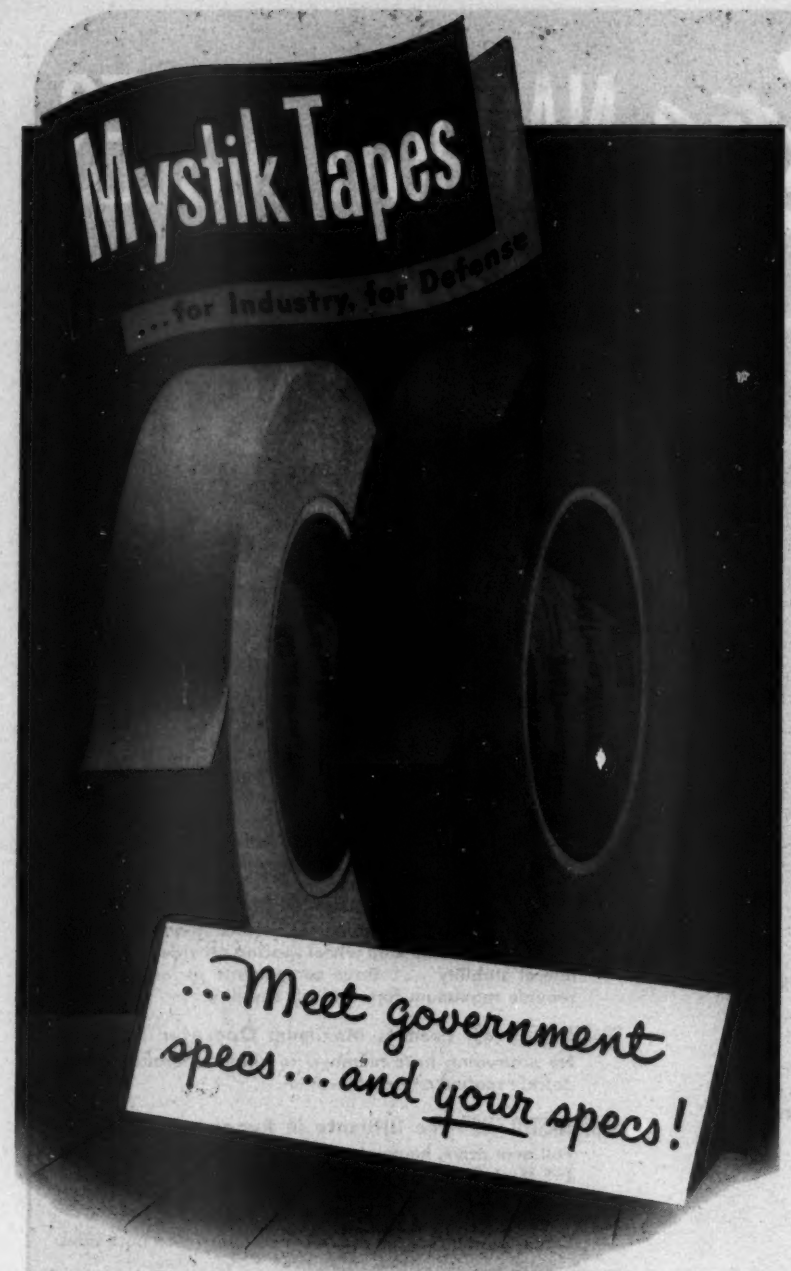
If your plant has 1000 employees, then 200—that's 20% of them—should be given civil defense jobs. That percentage is the Federal Civil Defense Administration's recommendation for protecting industrial establisments.

Other advice from the FCDA:

1. Expand nucleus of fire fighting, guard, medical units.
2. Put in communication system where plant is too large for quick contact of all personnel.
3. Obtain expert, up-to-date information on conditions of all plant buildings.
4. Integrate civil defense program with that of community.

Turn the page

Extra NARROW AISLES
New
SPACEMASTER
"49"
J Model
LEWIS-SHEPARD



Here are just two of the many kinds of cloth tapes and paper masking tapes made by MYSTIK. They meet the toughest specifications demanded by the government—but they go beyond that. They're built to meet *your* needs . . . on the production line and for protective shipping. MYSTIK is *proved* under toughest conditions . . . MYSTIK Cloth Tapes supplied 65% of the total needs of industry and the armed forces during World War II. Write for full information and samples. Mystik Adhesive Products, 2642 N. Kildare, Chicago 39.

Mystik Cloth Tapes • Mystik Paper Masking Tapes • Mystik Protecto-Mask
Mystik Dri-Pipe • Mystik Spra-Mask • Mystik Sand-blast

YOU MUSTN'T MISS—

Begins on page 254

Largest Wing Section

This 32-ft. wing section, longest ever made, was machined from a solid slab of aluminum. Grooves cut down its length leave standing ribs for stiffening. Lockheed Aircraft Corporation developed it, says it saves 1500 parts, 5000 rivets, and the 300 manhours formerly required to build up same section by riveting together smaller ones.

Jones: Take a Problem!

Here's the answer to all your questions—if your power isn't cut off. It's an "electronic answer man," developed by International Business Machines Corporation. It can do just about anything but figure your 1960 taxes.

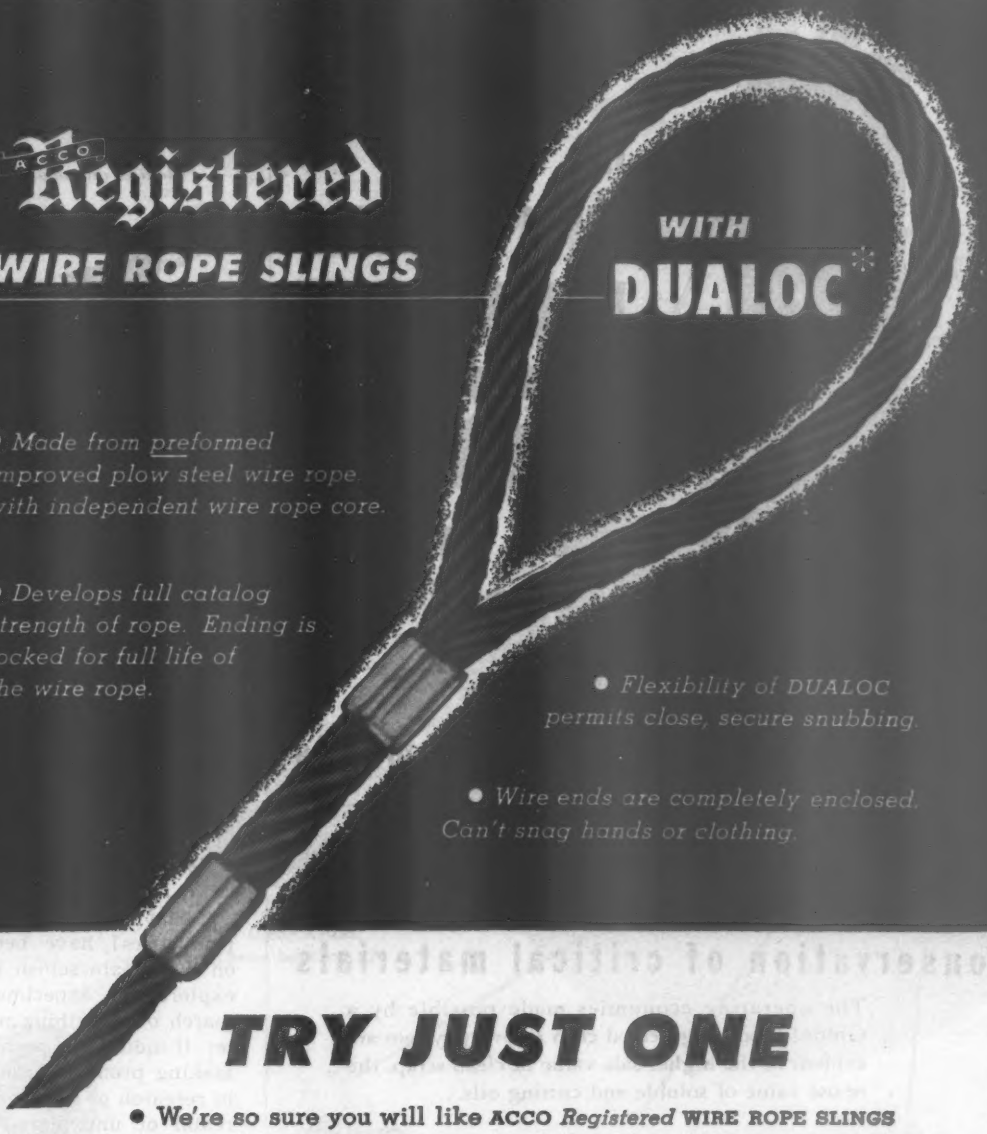
In this elaborate filing device, photoelectric eyes scan questions which you write on special cards in the 792-character IBM language, on answer cards that answer.

It's all made possible by condensed data, also in IBM langauge, on answer cards that you've already fed the machine. The "answering" is merely an electronic matching of questions and answer cards.

Turn the page

ACCO Registered
WIRE ROPE SLINGS

WITH DUALOC*



• Made from preformed improved plow steel wire rope with independent wire rope core.

• Develops full catalog strength of rope. Ending is locked for full life of the wire rope.

• Flexibility of DUALOC permits close, secure snubbing.

• Wire ends are completely enclosed. Can't snag hands or clothing.

TRY JUST ONE

• We're so sure you will like ACCO *Registered* WIRE ROPE SLINGS that we ask you to try just one. Put it in service with a sling you now use. Compare it in every way. You'll find it is stronger, lighter in weight, easier to handle, safer to use—and—cheaper in the long run.

• Proof-tested, registered, and warranted to satisfy. You can't lose if you use ACCO *Registered* STRAND-LAID and CABLE-LAID WIRE ROPE SLINGS. See your local distributor today or write us for further information.

*Trade Mark Registered

MEMBER THE NATIONAL SAFETY COUNCIL

ACCO

Wilkes-Barre, Pa., Chicago, Denver, Houston, Los Angeles, New York, Philadelphia, Pittsburgh, San Francisco, Bridgeport, Conn.

AMERICAN CHAIN & CABLE
WIRE ROPE SLING DEPARTMENT

TRADE MARK

In Business for Your Safety

Made by the Originators of *Preformed* WIRE ROPE

In chip recovery

only through engineering

...can efficiency be achieved

Industrial mobilization demands

maximum use of all materials in short supply—metals particularly. Unit production costs, as well as economy of over-all operation, are directly dependent on strict...

...conservation of critical materials

The operating economies made possible by a Gifford-Wood engineered chip recovery system are evident in the higher sale value of clean scrap, the re-use value of soluble and cutting oils.

To the metal-working industry this means

that a complete G-W salvage installation—crushers, conveyors, extractors, bucket-type elevators, loading bins—assures top efficiency. Centralized responsibility for the full installation designed to your requirements means saving in time and money. Sound business judgement dictates...

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When You Think of Materials Handling . . . Think of GIFFORD-WOOD

YOU MUSTN'T MISS—

Begins on page 254

QUOTES

Industry Is Selfish? Well—Is That Bad?

"Sure, industry is selfish. Why not? Industry is composed of human beings, and selfishness is a human quality. But is that necessarily bad? Selfishness need not be an evil force. . . .

"If men had not been imbued with selfish aspirations, is it likely that there would be 39-cent safety razors, 10-cent light bulbs, and a can of soup for a dime? Or electric refrigerators, radio and television within reach of millions? . . .

Selfishness spurs progress • "Indeed, it is fortunate for all of us . . . that men and groups of men (industries) have been spurred on by certain selfish interests to explore and experiment . . . in search of something new or better. If industry is prohibited from making profits, it cannot engage in research or risk venture in the realm of unexplored ideas and improvements; it cannot design and build machinery to make products better and cheaper. . . .

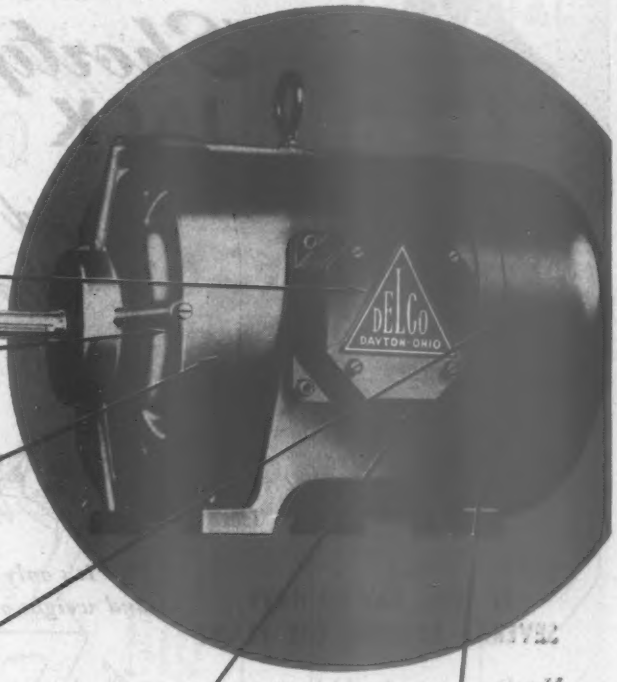
Industry needs incentive • "The term 'selfishness' when applied to industry should not be used loosely. . . . It is desirable that industry have incentive to create and improve processes and products; when incentive is withdrawn, progress ceases, and the loss is shared by all. As long as complete monopoly is controlled, selfishness in industry will be kept well in hand; competition will take care of that."—*Howard Cooper*, president, National Lubricating Grease Institute.

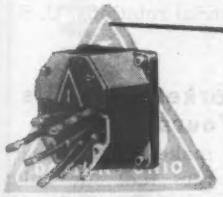
Turn the page

GO DELCO...

give motor trouble the BRUSH-OFF

Delco engineering has put a lot of extras into Delco Motors . . . and all for one reason: To give you a motor that will drive production machinery longer hours, with less chance of motor breakdown. Look over the rugged motor features below . . . and "go Delco."





WATER-TIGHT CONDUIT BOX
Absolute moisture protection

POSITIVE LUBRICATION
Lengthens bearing life

DELCOTE COIL INSULATION
Permanently flexible, moisture-proof and wear resistant

POSITIONED BEARINGS
Maintain shaft alignment

DYNAMICALLY-BALANCED ROTOR AND SHAFT ASSEMBLY
Reduces vibration, wear

CORROSIVE-RESISTANT CAST IRON FRAME
More solid, more rugged

"DELCO PREFERRED"
—because Delco Delivers

Open and enclosed motors for most industrial applications in sizes up to 100 horsepower for standard foot mountings. NEMA C&D flange-mounted motors available in sizes through 30 horsepower. Get in touch with Delco Products, Dayton, Ohio . . . or any sales office listed below.

DELCO DAYTON OHIO

DELCO MOTORS

DELCO PRODUCTS

Division of General Motors Corporation, Dayton, Ohio

SALES OFFICES: Chicago • Cincinnati • Cleveland • Dallas • Detroit • Hartford • Philadelphia • St. Louis

ALSO AVAILABLE THROUGH DELCO MOTOR DISTRIBUTORS

Hey Boss!

Here's that NEW

DUFF-NORTON "Shorty" JACK

... and it's a Honey!

"It's only 7" high and weighs only 22 lbs."

IT WILL PAY TO HAVE SEVERAL AROUND THE PLANT

Yes Boss, you should have one or more Duff-Norton "Shorty" Jacks in every department of your plant. Its low height of only seven inches and light weight make it the most versatile jack in our complete line. It can be spotted under equipment too low for other jacks. It will raise 15 tons 2½ inches with ease. Specify Duff-Norton "Shorty" on your next jack order. You'll want more of them when you see its outstanding performance.

"It'll lift anything with ease and safety."

Write today for Bulletin AD-12-K

THE DUFF-NORTON MANUFACTURING CO.

MAIN PLANT and GENERAL OFFICES, PITTSBURGH 30, PA.—CANADIAN PLANT, TORONTO 6, ONT.

"The House that Jacks Built"

YOU MUSTN'T MISS—

Begins on page 254

Supervisors Help Get Your Point Across

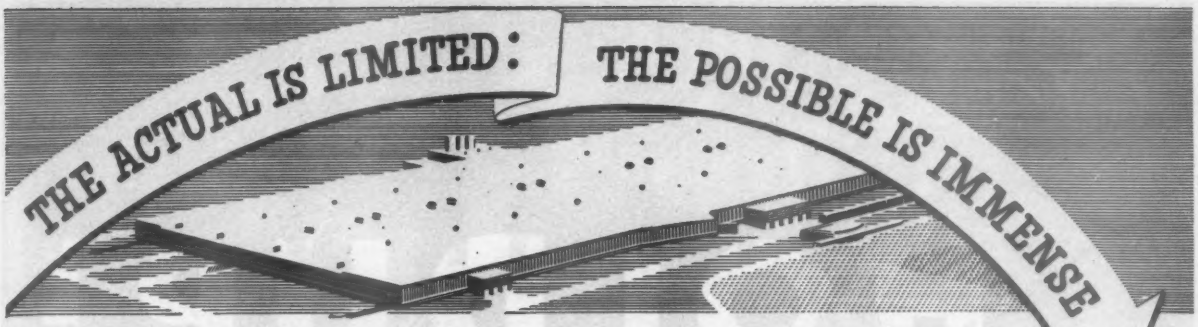
"In every survey I have been privileged to scan, the most important factor in employee relations is the supervisor. Sincerity and integrity on the part of management, and I include supervisors in management, effectively communicated to employees, and proper and sincere consideration of employees' viewpoints and problems are the sovereign means of achieving, not merely peace, but effective teamwork."—*Rear Admiral Wesley McL. Hague,* chief of industrial relations, U. S. Navy.

Make Workers Benefits Benefit Yourself

"If we can make it very clear to our employees that the only way to higher standards and real personal security is through more and better production at lower costs; that they stand to gain most from greater productivity; that technological improvements create jobs rather than eliminate them, then we need not worry that they will be deceived too long by false promises."—*Richard E. Roberts,* manager of employee relations, Ford Motor Company.

Effective Use of People Makes the Difference

"Today, where the machines and processes are available to all, the difference in competition is how well or how badly people handle their manpower. The new area of competition lies in the effective use of people. . . . If we can do a better job of convincing our workers (through proper incentive) to run and repair the machines so that we have less waiting time . . . we will get greater production out of the same machines than our competitors."—*W. G. Caples,* president, Inland Steel Container Corporation.



NEW LINCOLN PLANT CREATED BY INCENTIVE-INSPIRED CO-ACTION IN DEVELOPING POSSIBILITIES IN PRODUCT

© LE Co. 1951

STEEL DESIGN SAVES MATERIALS AND MAN-HOURS . . . CUTS COST 60%

WHEN a design utilizes the economies of welded steel, it can be produced for less cost because:

With welded steel, material costs are less. Only 50% to 25% as much metal is required. And, pound for pound, steel costs 75% less, giving an initial 7-to-1 cost benefit with which to start your designs.

With welded steel, fewer man-hours are needed for fabrication regardless of quantity produced. Smaller lots can be manufactured economically using simple tools. As quantities increase, designs can be modified further to replace some welding with bending, thus further reducing production costs.

Wherever costs with steel designs are higher, invariably the designs have fallen short of achieving the ultimate in savings possible with arc welding, or the products have been "over-designed." A restudy of every design by production engineers, before it becomes "frozen" for manufacture, helps eliminate costly details.

Your Lincoln Welding Engineer will gladly assist in analyzing your product requirements to cut costs.

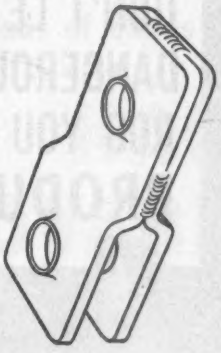


Fig. 5—Steel Stamping *from light gauge metal is formed in a die and welded. Weight is cut to 2 pounds . . . cost to 22¢ . . . a saving of 62% over Fig. 2. Saves 85% over Fig. 1.*

Fig. 4—Saves 16% Cost over Fig. 2 by replacing tubing with simple "U" formed from bent steel strap. Holes are prepunched prior to welding. Weighs 2½ pounds . . . costs 49¢.

Fig. 3—Uses Sheared Steel Strip to cut 10% from production costs, as compared with Fig. 2. Requires only simplest of fabricating equipment. Weighs 3 pounds . . . costs 54¢.

the ACTUAL

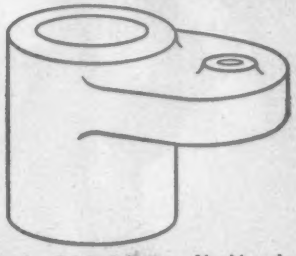


Fig. 1—Original Design. *Machine clevis weighs 7 pounds . . . requires drilling, boring, reaming and spotfacing operations. Costs $1.45 for material and labor.*

increasing the YIELD

Fig. 2—Welded Design Saves 60% Cost. *Fabricated from tubing and steel strap. Needs only fast, simple punching operation. Weighs 3¼ pounds . . . costs only 58¢.*

the IMMENSITY of the POSSIBLE

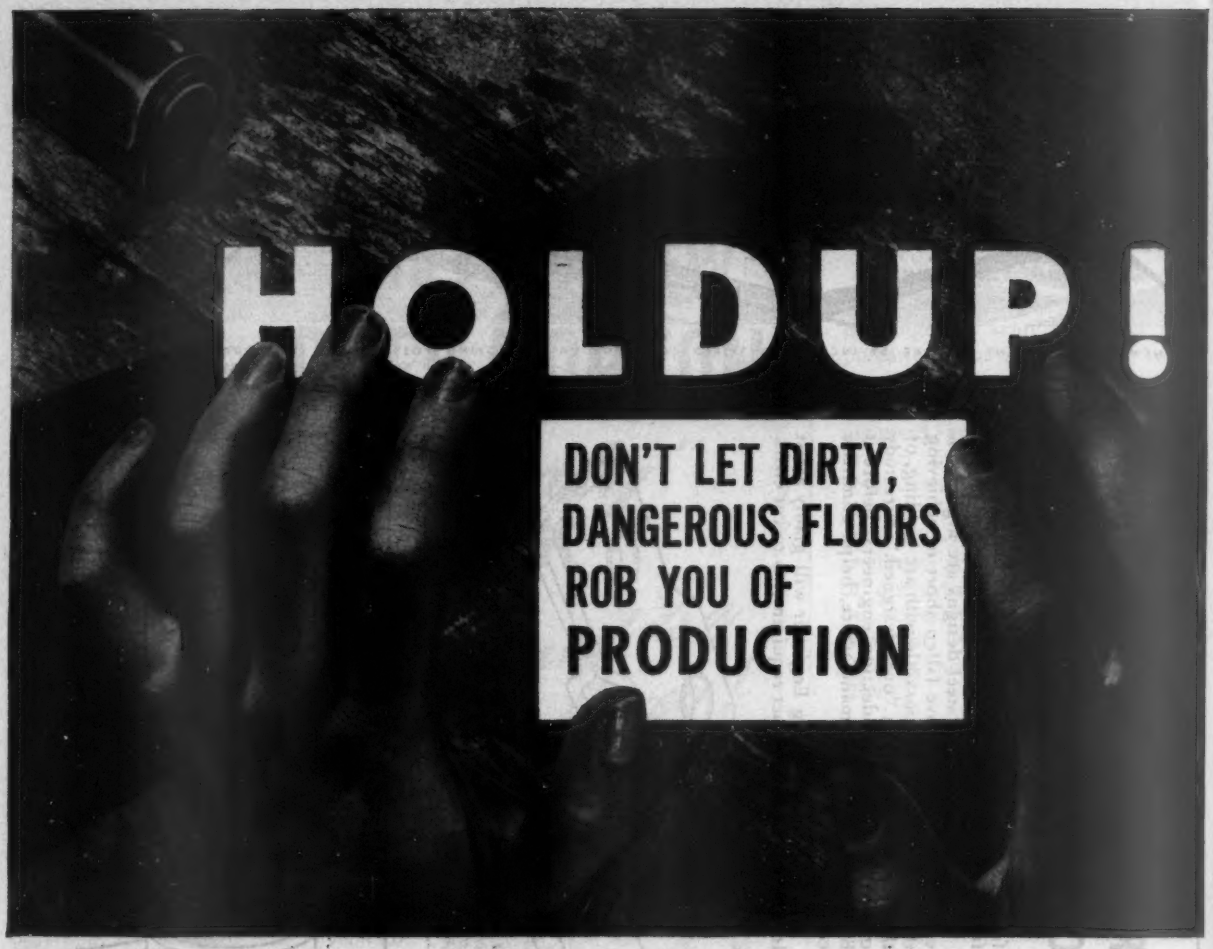
Lower Costs Regardless of Quantity Produced

SEE HOW STEEL DESIGN CUTS COSTS STILL FURTHER

Machine Design Studies are available to designers and production men. Write on your letterhead to Dept. 278

THE LINCOLN ELECTRIC COMPANY

CLEVELAND 1, OHIO



"Police" them with the "MYCO" Method of Floor Maintenance!

Beware of improperly-maintained floors! They are the avowed enemy of smooth plant operations. Every day they commit wholesale robbery in thousands of factories.

Armed with accidents, sickness, working handicaps and inefficiency — they hijack your help — hamper production — and drain off precious profit dollars.

But there's one certain way to stop this profit robbery and safeguard your plant production.

THE "MYCO" METHOD SAVES MONEY — OFFERS YOU VALUABLE BENEFITS

Improved Plant Efficiency And Lower Floor Maintenance Costs

The result of cleaner, safer, longer-wearing floors — floors maintained with top-quality, time-tested "MYCO" Cleaners, Dressings, Seals and Equipment.

A Complete Floor-Improvement Program — At No Extra Cost

Our trained floor technicians will visit your plant and put the following plan into action:

1. **SCIENTIFIC SURVEYS** of your floors.
2. **RECOMMENDATIONS** for treatment.
3. **PERSONAL INSTRUCTION** of your staff.
4. **PERIODIC INSPECTIONS** and reports.

Factories, businesses, schools and institutions the country over are benefiting from our 94 years of experience. We're ready to serve you promptly.

Send for our Valuable Free Floor-Care Booklet

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"MYCO means MORE for Your Money — More Value — More Service — More Satisfaction"

Plan Now to solve your OFFICE SPACE PROBLEM

permanently-

thousands of offices now enjoy the many advantages of

HAUSERMAN MOVABLE INTERIORS

ATTRACTIVE APPEARANCE
. . . blends perfectly with any type of decorating or functional office scheme.

PRACTICALLY NO MAINTENANCE
. . . never require repainting. Ordinary soap and water maintain like-new appearance indefinitely.

LIFETIME FACTORY SERVICE
. . . factory-trained experts ready on short notice to service or move your Hauserman installation.

IT PAYS TO PLAN AHEAD . . . and *now* is the time to plan to make maximum use of the cost-saving advantages of Hauserman *Movable* Interiors when you remodel or expand your offices.

Unprecedented demand for these modern walls and partitions has given us heavy *immediate* production schedules. By anticipating your needs in advance, you will insure delivery and erection of your complete Hauserman installation *on time.*

A Hauserman representative will be glad to answer your questions and give you detailed information about these and other advantages. Write *today* to The E. F. Hauserman Co., 7505 Grant Ave., Cleveland 5, Ohio.

Only **HAUSERMAN** *offers*

Korweld*

A new non-metallic panel construction which *exclusively* combines the best features of *all* types of interior partitions. It is soundproof . . . moistureproof . . . rigid . . . strong . . . durable . . . stays permanently flat. It's another result of unending research by Hauserman—pioneer in the conception, development and production of modern movable interiors.

*Trade Mark

HAUSERMAN
Movable Interiors

Constructed to Take Severe Punishment

Without Tube Swelling

Tube Securely Locked by Special Stainless Steel Inner Wire Braid!

Illustration above shows how exclusive inner stainless steel braid of CONCORD #20 Steam Hose prevents tube swelling and assures long life under severe use.

CONCORD #20 STEAM HOSE

Here's the steam hose with a structural difference that eliminates . . . once and for all . . . the common failure of tube swelling under continuous high pressure operation.

CONCORD #20 Steam Hose gives you the exclusive protection of a tough inner lining . . . a lining of stainless steel wire braid. This braid assures permanent retention of the original inside hose diameter. It prevents swelling and constriction of the tube . . . assures full flow of steam at all times . . . permits re-coupling in the field when necessary, without the slightest difficulty.

In addition, CONCORD #20 construction features include: two or three braids (depending on size) of alternate high tensile steel wire and rubber layers are firmly bonded over the outside of the tube. They provide maximum burst-protection and safety. An asbestos braid provides positive cover adhesion and serves as cover insulator. On top of all is the rugged, abrasion-resistant cover that withstands the severest abuse.

Flexible, tough and dependable . . . that's BWH's new CONCORD #20! Ask your nearby BWH distributor for a demonstration. Get in touch with him today, or write us direct.

Another Quality Product of

BOSTON WOVEN HOSE & RUBBER COMPANY

Distributors in all Principal Cities

PLANT: CAMBRIDGE, MASS. • P. O. BOX 1071, BOSTON 3, MASS., U. S. A.

BWH
DEPENDABLE RUGGEDNESS

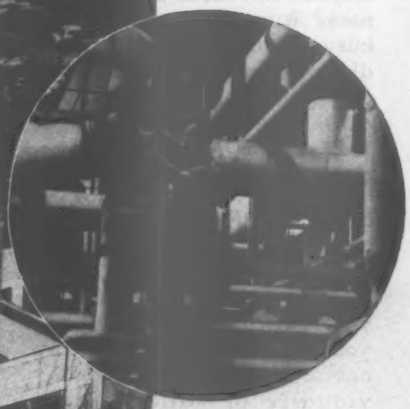
To fulfill its tremendous task of building engines and other aircraft components for defense and civilian needs, United Aircraft Corporation is in an almost continuous state of expansion.

An addition to the power house at the main plant in East Hartford (below) has recently been completed. The $12,000,000 Andrew Willgoos Turbine Laboratory was finished and put in operation on jet research in the past year. Under construction are new plant facilities at the Pratt & Whitney Aircraft Division in North Haven, and the Hamilton Standard Division in Windsor Locks, Conn.

When it comes to plant operation, United Aircraft is right down to earth. To make sure of lasting efficiency and low maintenance in fluid control, they chose Jenkins Valves for all of these new buildings. At the right is a typical valve station in the vast network of piping at the Willgoos Laboratory.

Long a leader in the development and production of piston engines, notably the famed Wasp, the Pratt & Whitney Division is now a major producer of jet engines like the J-48 Turbo Wasp that powers the Navy's new Grumman Panther, shown above.

To keep plant operating costs down to earth



United Aircraft Corporation relies on

JENKINS VALVES

LOOK FOR THE DIAMOND MARK

TRADE JENKINS MARK

Jenkins Bros

IAL DISTRIBUTORS EVERYWHERE

TOO BUSY FOR BUSINESS?

Is your switchboard a bottleneck? It is whenever it's too busy with *inside* traffic to handle incoming and out-going *outside* calls!

TAKE THE LOAD OFF YOUR SWITCHBOARD

SELECT-O-PHONE (automatically and without an operator) handles *all inside* communications independently of your switchboard — permits you to talk privately to from one to fifty-five stations, individually or collectively! SELECT-O-PHONE saves manpower, helps expedite orders, puts action into ideas — frees your city phones for profit-making calls.

GET THE FACTS!
Mail coupon today for full information.

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THE INSIDE VOICE OF BUSINESS

SELECT-O-PHONE DIVISION, Dept. 12-K
Kellogg Switchboard and Supply Company
6650 S. Cicero Ave., Chicago 38, Ill.

Please rush data explaining how I can save hours and dollars with SELECT-O-PHONE.

NAME_____
COMPANY_____
CITY_____ ZONE____ STATE_____

NEW MATERIALS

FAST-ACTING WATER-REPELLENTS made from silicone resin XR-129G are ready to protect plant masonry from weather and sunlight 24 hours after you brush or spray them on. In photo above simulated rainfall seeps into untreated masonry, but bounces off silicone-treated section. Silicone XR-129G minimizes efflorescence, staining, and spalling. But doesn't change wall texture or color. The thin film penetrates the surface, but doesn't stop wall-breathing. The Dow Corning Corp., Midland, Mich., thinks one application should last five years.

CORFOAM—a liquid phenolic resin—is a core material with high compressive strength (up to 500 psi.). When mixed cold, it foams to a hard consistency at room temperature. Corfoam has low moisture absorption, good adhesion to wood, paper, and plastics. It won't soften under heat, says maker, Rezolin, Inc., 4825 W. Jefferson Blvd., Los Angeles 16.

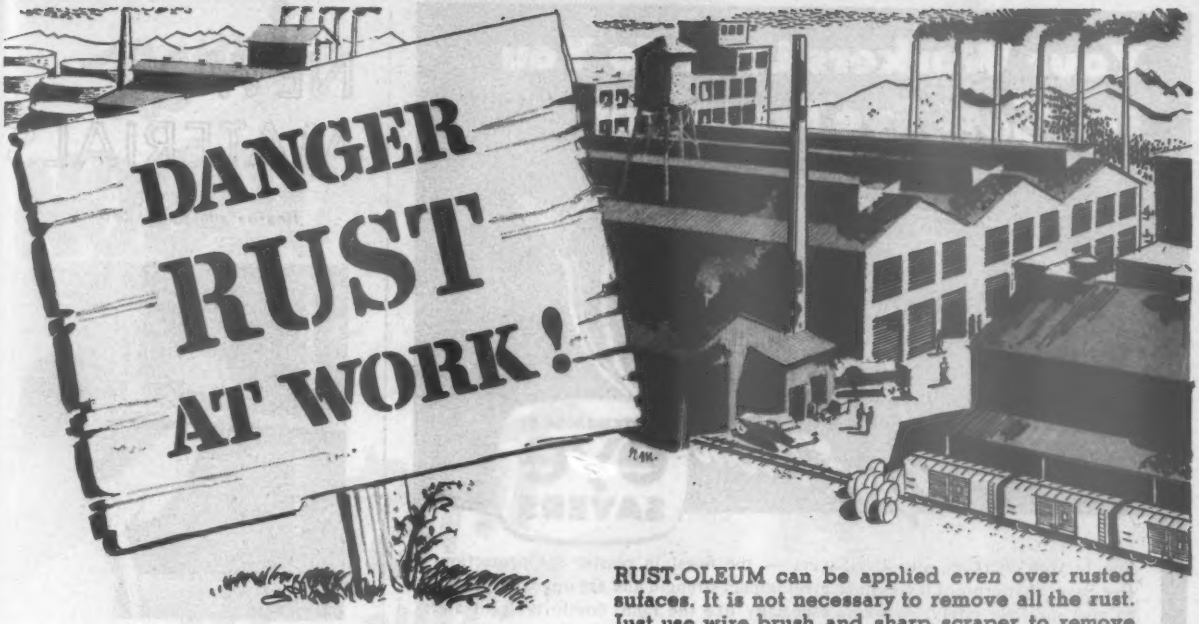
BONDED FIBER FLEECE is a new unwoven fabric you can use as an insulating filler or protective cover. The material won't shrink or crease. And it fully recovers its shape when pressure is removed. According to The Pellon Corp., 17 E. 42nd St., it traps twice as much air as a comparable wool fabric.

AN ALL-PURPOSE CLEANER—Magnus 751—can be used safely on any metal without pitting or marring the surface. It's non-flammable, too. You use it in either a hot or cold solution, following up with a cold-water rinse. The Magnus Chemical Co., Inc., South Ave., Garwood, N. J., recommends it for removing carbonized oil and gums from automotive parts.

TRANSLUCENT BUILDING PANELS diffuse sunlight to provide effective interior lighting. They're made of polyester resins reinforced with Fiberglas mat, come in flat or corrugated sheets. Shatterproof panels are recommended for skylighting. Resolite Corp., Delionople, Pa.

KLING-OIL is a general-purpose machinery oil with an affinity to metal. Its tacky adhesiveness causes it to cling firmly to moving machine parts, says maker, Magnus Chemical Co., Inc., Garwood, N. J. The result: less drippage, fewer oilings. You can use it on the same jobs and apply it in the same way as you would a standard SAE-30 oil.

Turn the page



SILENTLY, but ruthlessly *(even as you are reading this)* rust is gnawing away at machines, tanks, fences, pipes, fire escapes, metal sash, stacks —every rustable metal—inside and outdoors!

To protect your investment — to keep every possible pound of new steel for the defense program — to make all rustable metal surfaces last longer—*adopt rust control with RUST-OLEUM as an important part of your maintenance program.*

RUST-OLEUM stops rust! Its tough, pliable, rust-resisting film gives excellent protection that prevents rust losses under many difficult rust-producing conditions.

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RUST-OLEUM can be obtained promptly from Industrial Distributors' stocks in principal cities of the United States and Canada. Anticipate your needs and order now! For complete catalog see *Sweet's*, which also lists your nearest source of supply, or write on your company's letterhead for full information.

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Stops Rust

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1. Connect wires to receptacle. Fits standard 4" or 3¼" outlet box or plaster ring.

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3. Hang the fixture and plug it in. That's all! Self-grounding—regular 2-wire cord and plug may be used.

Hydee Hanger, complete with receptacle, two 5-ft. chains, "S" hooks and clips—

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02

DISTRIBUTED NATIONALLY BY LEADING ELECTRICAL WHOLESALERS

NEW MATERIALS

Begins on page 286

FLAT PLASTIC LAMINATE. Alsynite, makes ideal windows in case of A-bomb attack, according to the Alsynite Co. of America, 4670 De-Soto St., San Diego, Calif. Glass fiber reinforcing makes this laminate shatter-proof. And it diffuses sunlight into glareless interior illumination. Maker claims Alsynite gives better heat insulation, is cheaper to install than glass. You can cut and drill it with ordinary tools, fasten it with nails, screws, or mastic.

DRYPLY PRE-IMP is a polyester molding compound pre-impregnated with glass fibers. Flexfirm Products, Inc., El Monte, Calif., claims its Dryply combines the high chemical resistance of a polyester resin, the high impact strength and heat resistance of glass fiber. Recommended for standard compression and transfer molding techniques.

BLUE MAGIC NO. 1 is a special purpose compound for barrel finishing brass, bronze, copper, gold, and silver parts. The paste can be used alone, or with a non-ferrous media for roughing, deburring, cleaning, and finishing in one operation. Only 4 ounces of compound in a 32x30-in. barrel will give you a short finishing cycle, claims Blue Magic Chemical Specialties Co., 2135 Margaret St., Philadelphia 24.

New!

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Instant PUSH-BUTTON Reverse

Actual Size

A REVOLUTIONARY SCREW DRIVER and NUT SETTER

ARO's new push-button valve means *instant reverse action* . . . no need to remove from work . . . no stopping to turn levers . . . no wasted time.

Adjustable clutch (available with positive clutch). Length 7-11/16" . . . outside diameter 1-5/16" . . . weight 1.4 lb.

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☐ Please arrange an on-the-job demonstration. No obligation.

☐ Please send literature.

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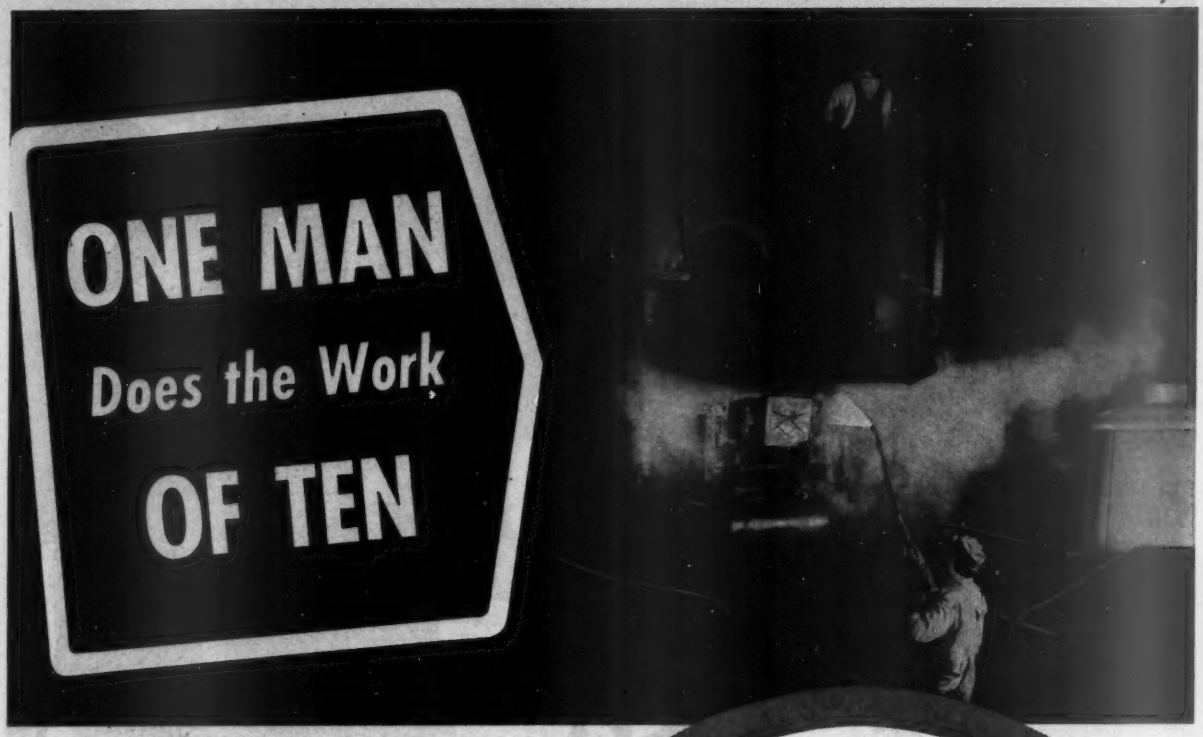
OF TEN



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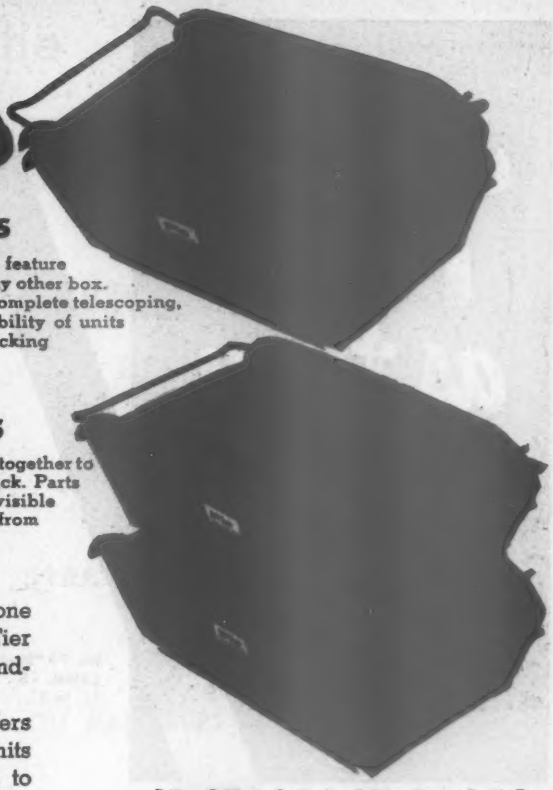
NESTIER



MORE THAN JUST A MATERIALS HANDLING BOX... IT'S A NEW PRODUCTION LINE TECHNIQUE

IT NESTS

A space saving feature not found in any other box. Bails prevent complete telescoping, eliminate possibility of units jamming or sticking together.

IT TIERS

Bails lock units together to form a rigid stack. Parts in all units are visible and accessible from either end.

OVER THREE YEARS OF RESEARCH and engineering have gone into the development of the new NesTier and the NesTier System—an entirely new technique for the most efficient handling of small parts in industry

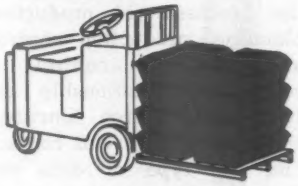
Designed by production engineers, the NesTier offers features not found in any other box. It saves space—50 units can be nested in a five foot stack. It saves time—no need to transfer parts from one container to another—no time lost in stockroom or on the line. Parts, in tiered boxes, are visible and easily accessible. And the NesTier can be easily carried, nested or tiered, by almost any means of transportation—even by hand. Compare this new system with your present method and see how NesTier can increase the efficiency of your plant.

IT STACKS IN RACKS

The NesTierac serves as a permanent stockroom fixture or can be carried by lift truck. Each pre-weighed to the ounce and clearly marked. Made of welded heavy gauge angle-iron.

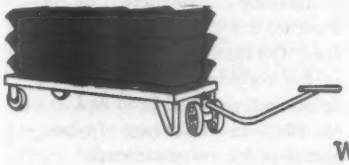
IT TRAVELS BY LIFT TRUCK

On pallets or in NesTieracs—loaded or empty, tiered or nested with units locking together to form rigid stacks.



IT TRAVELS BY HAND TRUCK

In narrow aisles, hand trucks easily transport NesTiers—tiered and loaded, or nested and empty.



IT TRAVELS BY OVERHEAD CONVEYOR

The offsets in the bails provide natural positions for conveyor hangers. NesTiers remain level, even on an incline.

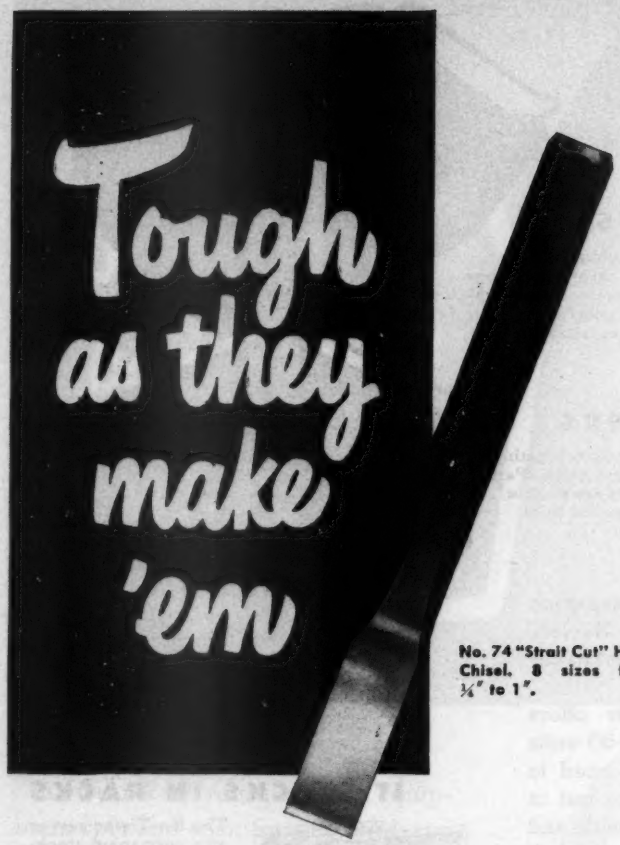
Write for full details on NesTiers, NesTieracs, monorail carriers, trucks and dollies. Our service includes complete engineering advice on systematizing the handling of small parts in your plant.

SPECIFICATIONS					
No.	Gauge	Length	Width	Depth	Weight
220	16	22⅜"	12½"	7¾"	15 lbs.
175	18	18 1/16"	9⅛"	6 3/16"	6 lbs.

WELDED HEAVY GAUGE STEEL, BAKED ENAMEL FINISH

NESTIER

Metal Specialties Division
THE CHAS. WM. DOEPKE MFG. CO., Inc., ROSSMOYNE, OHIO



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No. 6B Machine or Pin Punch. 5 point sizes, 4, 5, 6, 8 & 10/32" dia.

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BOOKS...

For copies of books and booklets reviewed, write directly to publisher listed.

. . . For Production Executives and Quality Control Men

Quality-Control Handbook

Edited by **J. M. JURAN.** McGraw-Hill Book Co., Inc., 330 W. 42nd St., New York 18. Charts, diagrams, tables, sample forms, appendices, index. 800 pp. $10.

This first handbook in the field of quality control brings you all the known principles and practices in one ready reference. It's a complete survey of all phases of quality control (not just statistical) compiled by specialists. The handbook explains the economics of quality control, tells you how to organize for quality, and outlines the workings of practical systems. You'll find plenty of basic theory to use in building your own system. Plus five chapters on problems in specific industries.

. . . For Production Executives

Production and Inventory Control

WILLIAM E. RITCHIE. Ronald Press Co., 15 E. 26th St. New York 10. Charts, diagrams, sample forms, index. 278 pp. $5.

This text brings into focus the problems of production planning, production control, and inventory control. It covers the relationship between these three functions, their major points of contact, and the type of data exchanged. The author breaks down the analysis of any production set-up into three steps —(1) determination of the amount and type of control required; (2) knowledge of the available control tools; and (3) selection of the best tools for the job. The author backs up his theory with case examples of 12 practical control systems.

Turn the page

Have you discovered the "Hidden Values" of LUNKENHEIMER engineering devices?

LUNKENHEIMER
BOTTLE OILER
FIGURE 1815

★

STRETCH PLANT CAPACITY

★

CUT MAN-HOURS OF MAINTENANCE

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REDUCE SAFETY HAZARDS

Your goal is fast, quality production. You install the best machinery and hire crack technicians. *Protect that investment* . . . keep your machinery humming at peak efficiency — with Lunkenheimer engineering devices.

Install Lunkenheimer Bottle Oilers at bearing points that are hard to reach and often neglected. Bottle Oilers *require less upkeep* and *cut accidents 'way down* on loom and card bearings in textile mills . . . on roller and fan shaft bearings of paper-making machines . . . in *every* plant where machinery moves. Pumps and all types of lubricators reduce costly maintenance shutdowns and eliminate the dangerous practice of hand-oiling moving machinery.

Don't overlook Lunkenheimer's *complete* line of engineering devices — pop-safety and blow-off valves, water gauges and gauge cocks, fusible plugs, lubricators for compressor and pump cylinders, and oil and grease cups. Get together with your Lunkenheimer distributor. He'll be glad to show how Lunkenheimer engineering devices will boost your output, cut accidents, and protect your overworked—and irreplaceable—machinery.

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to *speeded-up* industrial feeding

AerVoiD Hot Food Carriers, AerVoiD Hot Liquid Carriers, AerVoiD Mobile Canteen

Hot flavorful foods kept hot by AerVoiD high vacuum insulation for workers that cannot come to a cafeteria without too much loss of time. A hot coffee pick-up for workers at their work with AerVoiD vacuum insulated liquid carriers. Hot coffee and light refreshments serviced directly to workers at their work with the AerVoiD narrow aisle Mobile Canteen.

In peace or defense industrial feeding AerVoiDs do a job that cannot be accomplished with any other equipment . . . because AerVoiDs alone do the job of transporting and distributing of hot foods for service a distance from the kitchens where they are prepared.

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AERVOID *vacuum insulated*

HOT FOOD, SOUP, AND COFFEE CARRIERS

BOOKS...

Begins on page 292

. . . For Plant Engineers and Maintenance Supervisors

Metallizing Handbook

INGHAM & SHEPARD. Metallizing Engineering Co., Inc., 38-14 30th St., Long Island City 1, N. Y. Illustrations, charts, tables, index. 249 pp. $3.

Long on know-how and practical tips is this detailed study of metallized coatings. It covers the entire field of metal spraying — preparation, application, ventilation, and safety. You'll also find answers to such special problems as:

- Mass production coating.
- Repair of glass-lined tanks.
- Metallizing non-metals.

. . . For All Management

Clear Writing for Easy Reading

NORMAN G. SHIDLE. McGraw-Hill Book Co., Inc., 330 W. 42nd St., New York 18. 176 pp. $3.

You may or may not find it easy to write. But the big question to ask yourself, says author Shidle, is whether the other fellows in the plant find you easy to read. To test the readability of your own writing, you can quickly score it on the Shidle slide-rule. If your score is low, you should try putting into practice some of the author's common sense aids to readable writing.

. . . For Maintenance Engineers

Corrosion: Causes and Prevention

FRANK N. SPELLER. McGraw-Hill Book Co., Inc., 330 W. 42nd St., New York 18. Illustrations, charts, tables, appendix, index. 686 pp. $10.

Here's a working guide to help you wage war on corrosion. This book opens up with the theory of corrosion. Then goes into a detailed description of methods of preventing corrosion in specific situations. Emphasis is on the ferrous metals.

Turn the page

This man...

SOLVES YOUR INVENTORY PROBLEM

Inventory often is too much and too soon. It ties up money needed for operating expenses or it ties up the plant by lacking things it should supply.

There is a man in your locality who will finance your inventory. He has at all times approximately $500,000,000 invested in the tools, equipment and materials you need. He will gladly and promptly supply from his large local stocks many things which you frequently and urgently need. Why not get better acquainted with this man.

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Saves 60%

In Packaging Time with Angier Paper that

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40 hours a month instead of 100! Yet, this 60% cut in packaging time is only part of the savings.

Now that Whitin — big name in textile machinery — has adopted Angier VPI* Wrap, slushing of parts with grease is not necessary. These rollers, for example, are simply packed in boxes lined with VPI Wrap. Inside these boxes, Angier's amazing paper gives off a vapor that *prevents corrosion.* Now rollers arrive at the mills rust-free and clean — ready to use. "Cleaning" time saved is 1 hour per box — an average of 400 hours saved a month.

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Slushing took 15 minutes

Now 6 minutes does it with Angier VPI Wrap

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BOOKLETS

Begins on page 292

AN EVALUATION OF THE HARDENING POWER OF QUENCHING MEDIA FOR STEEL. University of Illinois, Engineering Experiment Station, Urbana, Ill. Through a simple hardenability test, Illinois engineers have prepared data on the relative hardening power of the standard quenching media — water, brine, and oils. The heat treater can readily interpret their results in the light of his own processes. Illustration, charts, bibliography. 131 pp. $1.50.

THE ART AND SCIENCE OF GRINDING. Cleveland Quarries Co., Sterling Grinding Wheel Div., Tiffin, Ohio. Describes the different types of grinding wheels —where and why you use each; how and when you dress and balance them. Includes tables on operating speeds, flange dimensions, spindle diameters. 42 pp. Free.

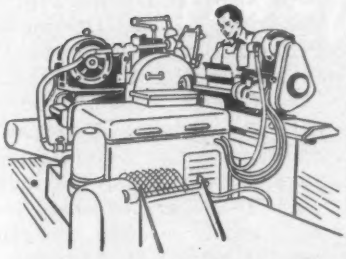
MACHINING OF STAINLESS STEELS. Metal Cutting Tool Institute, 405 Lexington Ave., New York 17, N. Y. A report on the optimum tool designs, speeds, feeds, and coolants to be used in machining the various wrought stainless steels. Based on practical experience. 27 pp. $1.

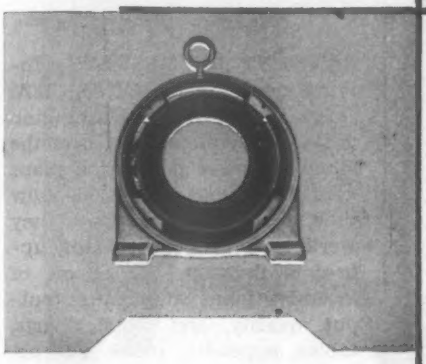
OCCUPATIONAL OUTLOOK HANDBOOK. Supt. of Documents, U. S. Government Printing Office, Washington 25, D.C. Analyzes the supply and demand in 433 major occupations for the years to come. Indexed according to occupation and industry. Illustrations, tables, references. 574 pp. $3.

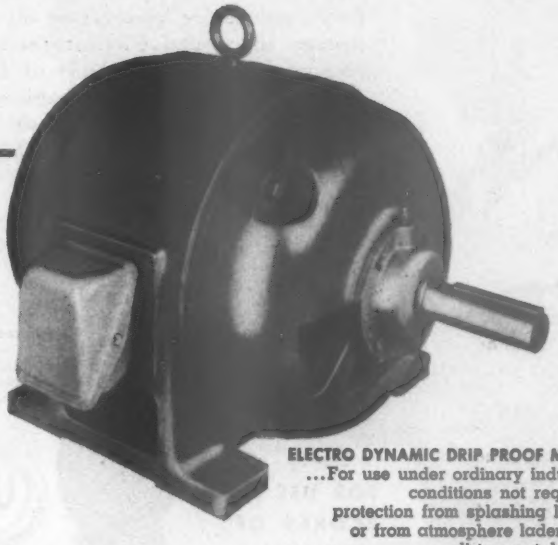
SCREW THREAD GAGES AND GAGING. American Society of Mechanical Engineers, 29 W. 39th St., New York 18. A revised American Standard. Diagrams, tables, charts. 86 pp. $4.

Turn the page

ELECTRO DYNAMIC MOTORS
laugh at down-time!







ELECTRO DYNAMIC DRIP PROOF MOTOR
...For use under ordinary industrial conditions not requiring protection from splashing liquids or from atmosphere laden with dirt or metal chips.

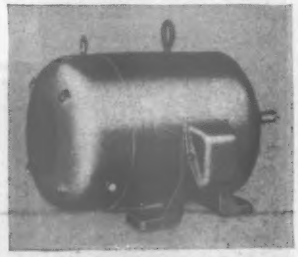
Extra Care and Superior Materials At the Windings Reduce Motor Failure To the Vanishing Point

Thanks to long experience in the exacting marine field, Electro Dynamic knows how to build industrial motors that stand up under the most gruelling kind of use. And that's mighty important today.

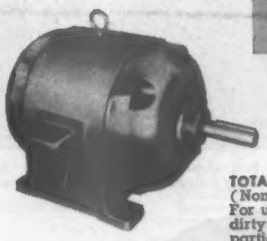
E. D. motors are tough where motors should be tough —at the *windings*, "the heart of the motor". Extra care, special skills and the very best insulating materials go into E. D. windings. That's why costly motor failures and down-time are almost unknown with these dependable power units. Heavy cast corrosion-resistant frames give added durability. Every motor is dynamically balanced.

Yet E. D. motors are *competitively priced!* Get all the facts before you specify *any* motor. Write today for illustrated literature.

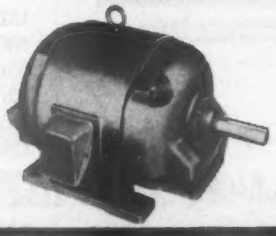
There's a Reason for Their AMAZING STAMINA



TOTALLY ENCLOSED (Fan Cooled)
...For dirt-laden atmosphere, especially where the installation requires a motor of compact dimensions.



TOTALLY ENCLOSED
(Non-Ventilated)...
For use in exceptionally dirty atmospheres, particularly when metallic dust is present.



SPLASH PROOF...For installation where the motor is subjected to splashing liquids or hosing down for cleaning.

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E. D. industrial motors are built in a wide range of types and sizes, 1 to 250 h.p. Also a complete line of Direct Current motors and generators. Literature on request.

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builds great motors

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makes liquid handling SAFER

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FOR USE IN SCORES OF INDUSTRIAL OPERATIONS

For filling all coolant reservoirs directly from drum.

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Factory Branch: 1652 Howard Street, San Francisco 3, California

BOOKLETS

Begins on page 292

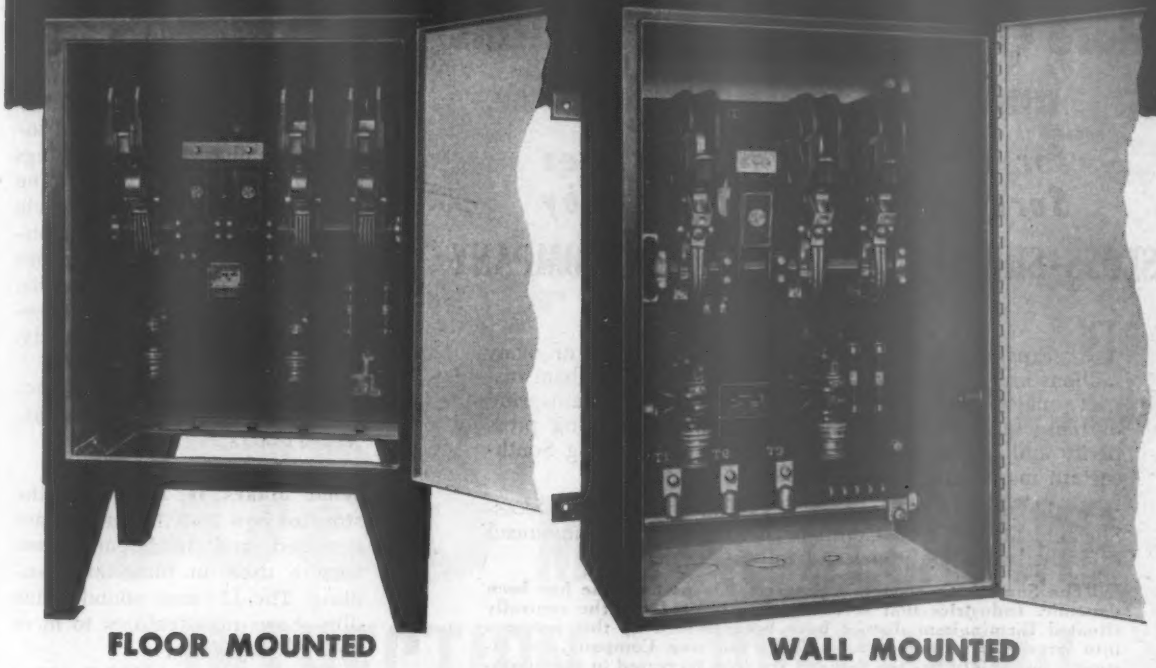
CIVIL DEFENSE IN INDUSTRY AND INSTITUTIONS. Supt. of Documents, U. S. Government Printing Office, Washington 25, D.C. An outline by the Federal Civil Defense Administration to help you organize a system of plant protection. Covers general steps to be taken by all industries. To be supplemented later by manuals covering the problems of individual industries. 70 pp. 25c.

PAYMENT BY RESULTS. International Labor Office, 1825 Jefferson Pl., N.W., Washington 6, D.C. A detailed analysis of the many incentive production plans used throughout the world—how they are applied and how they work in practice. Contains up-to-date data on the effects of incentive plans on earnings, output, quality, and costs. Charts, tables, appendix, index. 204 pp. $1.25.

THE OPERATION OF SICKNESS BENEFIT PLANS IN COLLECTIVE BARGAINING. Department of Economics and Social Institutions, Industrial Relations Section, Princeton U., Princeton, N. J. A survey of 10 representative plans. Discusses financial arrangements, administrative procedures, and adequacy of sickness benefits. For readers who scan, there's a chart that outlines the mechanics of all 10 plans. 109 pp., 6x9½. $2.50

IMPROVING OFFICE PLANNING AND CONTROLS. American Management Assn., 330 W. 42nd St., New York 18. Covers office expansion, impact of office standards, manpower budgeting control, and the operations budget. There are sections on the charting of clerical operations, printed forms control, and the protection of records. 40 pp. Members, $1 non-members, $1.25.

EC&M Heavy-duty Motor Starters* Pay Off on essential drives



FLOOR MOUNTED

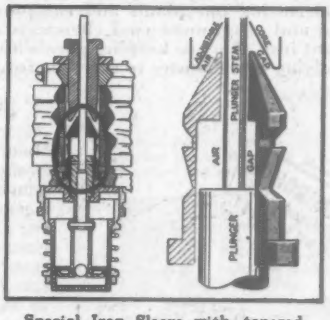
WALL MOUNTED

You Save MORE when you give Plant Management Continuity of Service

For pumps, compressors, conveyors and similar drives essential to a plant's over-all production, keep in mind the qualities of EC&M Motor Starters that help speed output.

EC&M's magnetic Overload Relays give dual protection. They trip *instantly* on heavy overloads and provide inverse time-element trip to safeguard motors under all conditions. A magnetic balance absorbs starting currents and permits a low current-setting for running protection. These relays use silicone dashpot fluid.

Combined with EC&M's well-known *LINE-ARC* Contactor to open and close the motor circuit, these starters are unequalled for industry's important drives.



Special Iron Sleeve with tapered wall thickness provides non-creeping relay permitting low current-setting.

***For low voltage—550 volts or less.**

For COMPLETE FACTS, ask for Bulletins 1067 and 1180-2.

THE ELECTRIC CONTROLLER & MFG. CO.

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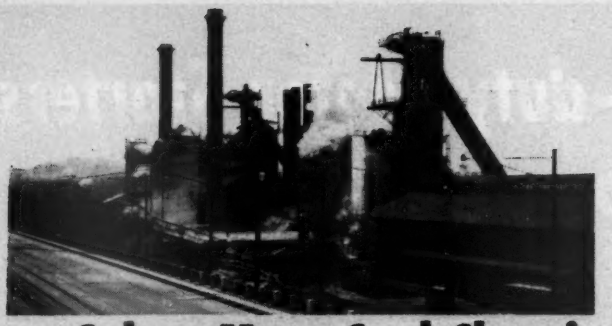

More Coke..More Coal Chemicals and soon More Pig Iron

for Southeastern Industries Served from Birmingham by

SLOSS-SHEFFIELD STEEL & IRON COMPANY

Big expansion programs involving expenditure of many millions are the order of the day with the Birmingham district's major industries that serve the Southeast. Mainspring of these large-scale developments is the burgeoning prosperity and accelerating progress of the surrounding Southeastern market area.

In the words of Claude S. Lawson, president of Sloss-Sheffield Steel & Iron Company, which recently announced extensive plant additions and improvements:

"The Southeast's economic progress this past decade has been dynamic. Industries that serve the Southeast from the centrally situated Birmingham district have been levered by this progress into large expansion programs. Take our own Company, for instance. So rapidly has the demand for iron increased in the Southeastern trade area that we are making the largest investment in new facilities in our Company's recent history. We are building a new battery of coke ovens to serve our own furnaces and the booming foundry trade . . . opening new coal and ore mines . . . enlarging and diversifying our production of coal chemicals and further modernizing our plants and equipment. This will result in more coal and coke, more coal chemicals and by-product gas and merchant iron. We are keeping pace with the Southeast's progress and readying our industry to serve its future needs."

* * * * * * * *

Many types of industry in the strategically located Birmingham district are growing with the Southeast. Many are moving in. The Committee of 100 or any of the undersigned members of the Executive Committee will welcome the opportunity to give you confidential and specific data regarding the advantages of the Birmingham district for your plant, office or warehouse.

BIRMINGHAM COMMITTEE OF 100

1914 Sixth Ave., N., Birmingham, Ala.

Executive Committee

Gordon Persons, Governor, State of Alabama
Bradford C. Colcord, President, Woodward Iron Co.
John S. Coleman, President, Birmingham Trust National Bank
Donald Comer, Chairman of the Board, Avondale Mills
William P. Engel, President, Engel Companies
W. W. French, Jr., President, Moore-Handley Hardware Co.
Clarence B. Hanson, Jr., Publisher, The Birmingham News
W. H. Hoover, President, Employers Insurance Co. of Alabama
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Thomas W. Martin, Chairman of the Board, Alabama Power Co.
J. C. Persons, President, First National Bank
O. W. Schanbacher, President, Loveman, Joseph & Loeb
A. V. Wiebel, President, Tennessee Coal, Iron & Railroad Co.

. . . Do you have a film or films that might help management do a better job? Help employees learn their job faster, better? If so, tell us about it and we'll pass the information on to those who can use your . . .

INDUSTRIAL FILMS

Disaster Control points up the need for efficient plant organization to combat atomic bombings and other industrial disasters. The animated, 21-min. sound movie describes the simple steps management should take first in organizing disaster control units. The accent is on saving lives, restoring production flow quickly. For sale at about $100 from:

McGraw-Hill Book Co., Inc., Text-Film Dept., 330 W. 42nd St., New York 18.

What Makes It Tick tells the story of how fork lift trucks are designed and made and how they're used in materials handling. The 15-min. sound-slide film shows new features to meet new needs. Write:

Towmotor Corp., 1226 E. 152nd St, Cleveland 10.

Man on the Land illustrates through agriculture and the oil industry that a free, competitive atmosphere is the only one that can bring progress and prosperity. It's animated, in full color, and a ballad singer does the narration. Runs 16 minutes. Write to:

American Petroleum Institute, 50 W. 50th St., New York 20.

The Shape of Things to Come is a 30-min. film in color showing some advantages of designing around extruded aluminum parts. There's a camera tour through an aluminum extrusion mill, with glimpses of fabricating, heat treating, straightening, and inspecting operations.

Motion Picture Dept., Reynolds Metals Co., 2500 S. 3rd St., Louisville 1.

Less MOTOR CLEANING ...INSPECTION...OVERHAUL!

HERE'S A MOTOR that actually blows itself clean! Dirt is carried away by cooling air blown over the ribbed cast iron frame and bearing housings of this new Allis-Chalmers tefc motor.

Dirt can't build up to cause overheating. Concealed air passages and pockets have been eliminated. Even oily dirt that sticks can simply be wiped or blown off.

And this means savings! Maintenance costs are traditionally low on totally-enclosed, fan-cooled motors. But they're lower than ever before on the new Allis-Chalmers Type APZ tefc motor.

Rigid Construction

The frame is cast iron which has high resistance against corrosion and distortion. Bearings are pre-lubricated at the factory and should need no attention for years. Tapped holes with pipe plugs to permit regreasing and to provide grease relief are standard equipment.

Get All The Facts

The new Allis-Chalmers Type APZ totally-enclosed, fan-cooled motor is built in all NEMA standard frame sizes from 224* to 505. Also in explosion-proof type. Your A-C Authorized Distributor or District Office has complete information. Call today, or write Allis-Chalmers, Milwaukee 1, Wisconsin. Ask for Bulletin 51B7225.

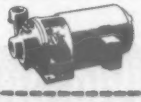
A-3426

Sold . . .
Applied . . .
Serviced . . .

by Allis-Chalmers Authorized Dealers, Certified Service Shops and Sales Offices throughout the country.

CONTROL — Manual, magnetic and combination starters; push button stations and components for complete control systems.

TEXROPE — Belts in all sizes and sections, standard and *Vari-Pitch* sheaves, speed changers.



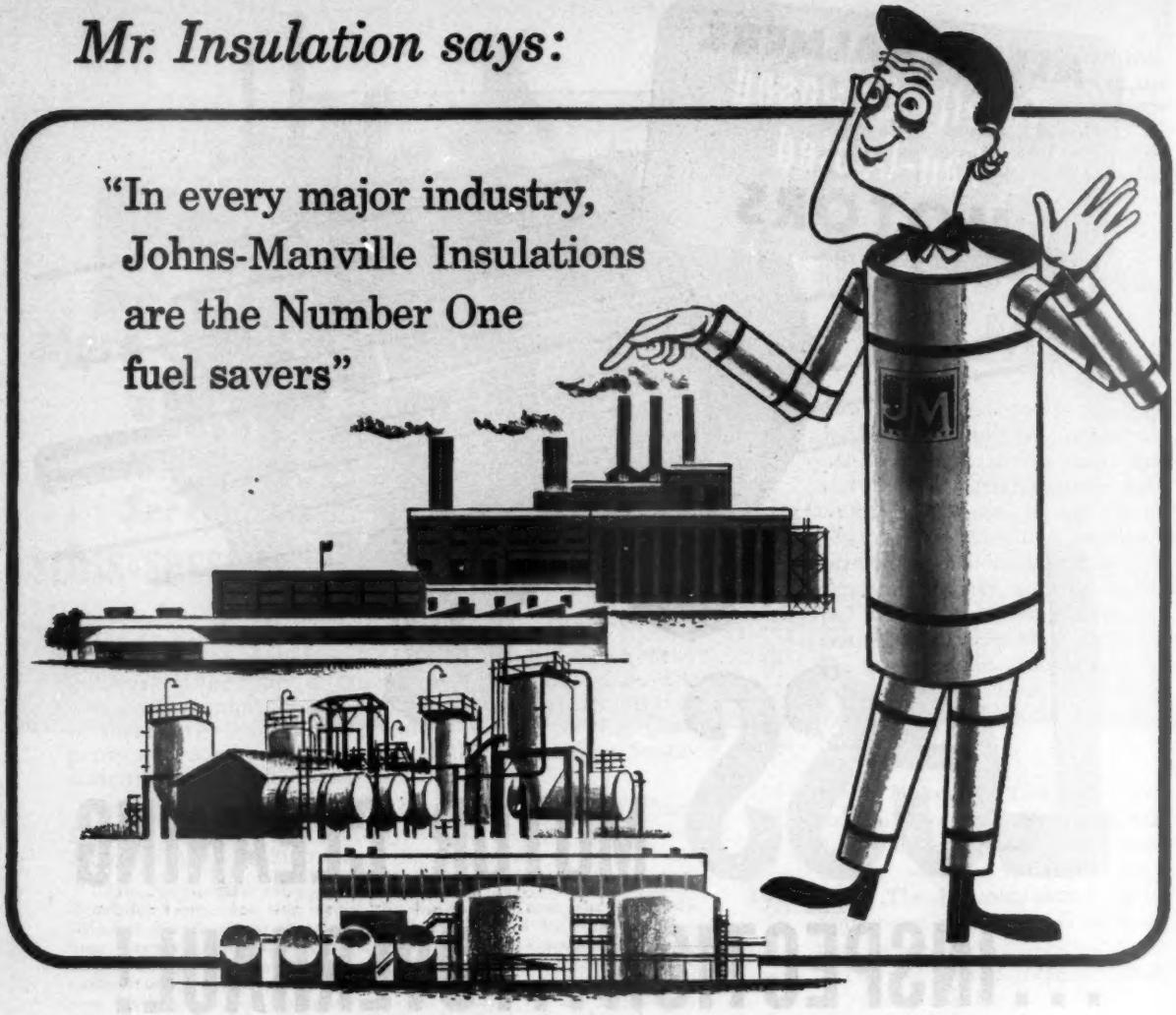
PUMPS — Integral motor and coupled types from ¾ in. to 72 in. discharge and up.

Texrope and *Vari-Pitch* are Allis-Chalmers trademarks.

ALLIS-CHALMERS

*Similar design non-ventilated motors Type APK, also available in frames 203 to 224 inclusive.

Mr. Insulation says:



IN PLANTS with stacks or stills, tanks or towers, the story is the same—"Insulation by Johns-Manville" means the maximum return on your investment. There are two good reasons for this:

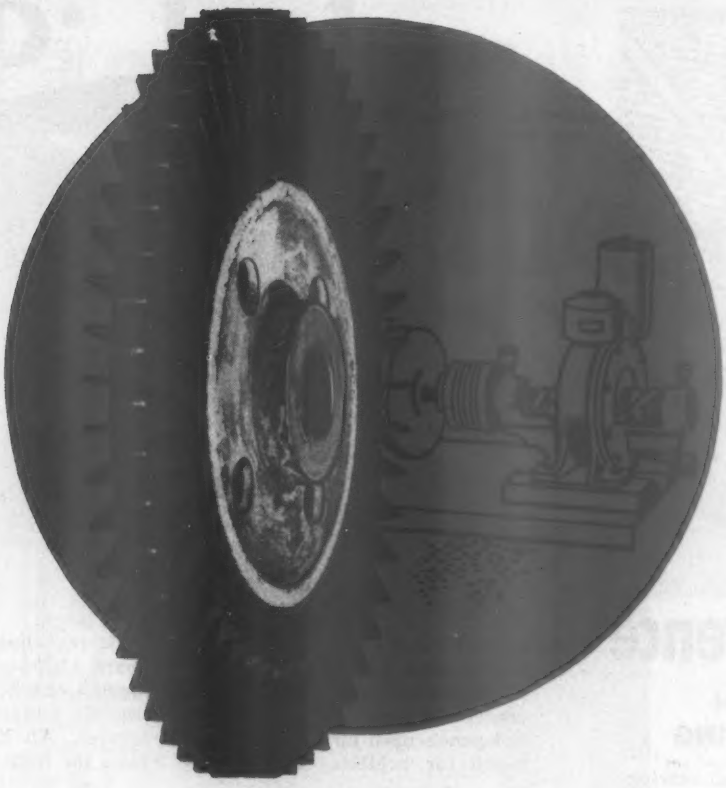
1. YOU GET THE RIGHT *MATERIALS*—From asbestos and other selected raw materials, Johns-Manville manufactures a wide range of industrial insulations for service from 400F below zero to 3000F above. If you need engineering advice in determining exactly the right one for your job, you can get experienced and authoritative assistance from your local Johns-Manville insulation engineer.

2. YOU GET THE RIGHT *APPLICATION*—Even correctly selected insulation needs proper application to permit it to serve at peak efficiency through the years. Here you can always count on J-M Insulation Contractors and their highly skilled mechanics. These organizations are trained in Johns-Manville application methods, and have generations of insulation experience behind them.

Why not get the complete picture? Call on insulation headquarters when your next job is in the planning stage. Just write Johns-Manville, Box 290, New York 16, N. Y.

JM

Johns-Manville *first in* **INSULATIONS**



Found:
The 2% that cured a Pickled Pump

How years of N-B-M Metallurgical experience paid off by solving a severe problem of corrosion

When a vinegar producer suddenly starts having frequent pump failures due to extreme impeller corrosion, it's pretty evident that something unusual is going on . . . particularly when the same pump had been used successfully for years. The pump manufacturer sent an engineer to the installation . . . and found that *concentrated* vinegar was being pumped, instead of *diluted* vinegar as before. Impellers in some cases were lasting only 1 week.

The pump manufacturer came to us with the facts—and our Metallurgical Department was immediately put to work on the problem.

Result? **In a matter of days, impellers of a new alloy were on their way with a slight but important alloy change . . . the addition of 2% nickel. These impellers now last 18 months to 2 years—longer than they ever had before!**

We're proud of examples like this . . . because they show how effectively our facilities for Research and Engineering — combined with 75 years of practical application experience—make money-saving solutions to problems on . . .

Non-Ferrous Bearings and Castings—
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Bronze Bars—
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For every type of bearing service

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Full 100% serration of all bearing bars and cross bars insures 360° non-slip protection . . . in any weather . . . under all conditions.

More Apex Safety Grating, made by A. O. Smith Corporation, is used on America's railroads than all other makes combined. For 15 years A. O. Smith *locked-for-life* grating construction has provided the ultimate in strength and reliability in this, the severest service of all.

Now this time proved safety grating is available for industrial applications. You owe it to the safety of your employees to specify this outstanding safety grating.

Let A. O. Smith put your plant on a safe footing.

Stair Treads . . . and plain surface grating . . . where maximum non-skid protection is not essential . . . are also available.

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☐ I am interested in a Distributorship.

EVERYTHING IS HANDY for the leader at the front of the American Management Association's new conference rooms. The hinged walnut panels open up to show a cork board for exhibits. Boards slide back, revealing green glass chalkboard. Insides of panels contain flip-flop charts. And panels below provide storage space and bookshelves. All lights are controlled from the front.

Convenient New Room Makes Conferences Click

Here's the American Management Association's new conference room. It's full of good ideas for you if you're not happy with what you have, or want to set up a room from scratch. Whether you want your room plain or fancy doesn't matter, says AMA. The ideas can be used either way.

WHAT'S THE BEST WAY to make a conference really *work*? There are two answers:

- Get the right leaders and topics.
- Run the conference in the right surroundings.

The American Management Association, for years industry's great training and communications medium, has never had any trouble with the first of these answers. Its conferences are famed for their content and leadership.

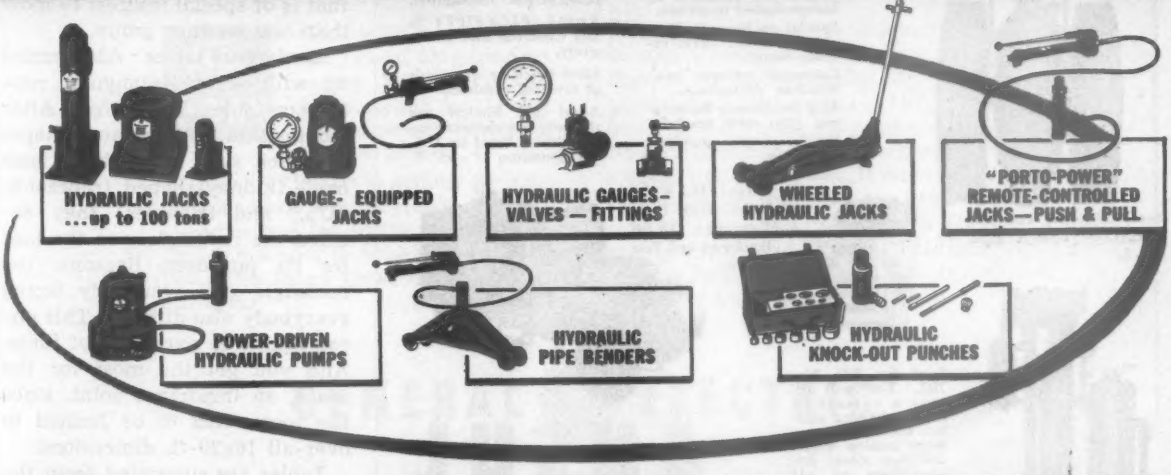
But AMA has long been concerned about the surroundings for its sessions. Big hotels are fine for large group meetings. But what about the small seminars that AMA has been sponsoring so successfully the last couple of years? Hotel conference rooms just didn't fill the bill, in the judgment of AMA's critical staff members. They wanted something better—tailor made to their needs, and designed to encourage the free exchange of ideas that a good conference demands.

Result is a new set of seminar rooms, just opened at AMA head-

Pick the right jack for the job...

...from the world's most complete line of hydraulic equipment

Versatile Blackhawk hydraulic jack — equipped with a gauge — fits into this specialized shop-built press. This is just one example — these low-cost jacks will measure or test a load . . . power a press . . . push, bend, straighten. *Don't do it the hard way — do it the hydraulic* way!



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Sold by leading distributors. Write for catalogs. Blackhawk Mfg. Co., Dept. J-27111, Milwaukee 1, Wisconsin.

See a complete display of Blackhawk equipment — Plant Maintenance Show, Philadelphia, January 14-17

ASK ANY QUALIFIED AND IMPARTIAL AUTHORITY . . . HE'LL TELL YOU . . .

YOUR *BEST* PROTECTION
FOR FLAMMABLE LIQUID, GAS AND ELECTRICAL FIRES

ANSUL
DRY CHEMICAL
FIRE EXTINGUISHING EQUIPMENT

You, who have seen or used an Ansul Dry Chemical Extinguisher at a fire demonstration or on an actual fire, quickly recognized its superior fire-fighting capabilities. Further investigation proves that Ansul "Water-tight Construction" provides greater dependability under severe exposure conditions.

Ansul Hand Portable Models — 4, 4-B, 20-B and 30-B.

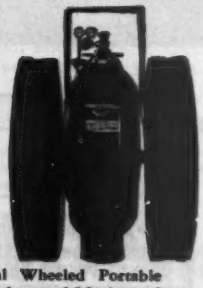
Fire Chiefs, insurance inspectors, safety engineers, etc. recognize Ansul as the leader in the dry chemical extinguisher field. Ansul Fire Extinguishing Equipment and *"PLUS-FIFTY"* Dry Chemical have set unparalleled standards of quality for the fire extinguisher industry.

You get *complete* dry chemical fire protection only from Ansul. There is an Ansul Dry Chemical Fire Extinguisher of the proper size for almost every flammable liquid, gas and electrical fire hazard.

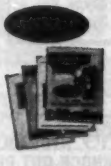
Safeguard your plant and irreplaceable equipment with the *BEST* fire extinguishing equipment available. Protect them with ANSUL EXTINGUISHERS.

ANSUL EXCLUSIVE FEATURES

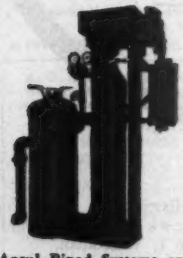
- Patented Nozzle assures most effective stream pattern . . . Best results by inexperienced operators.
- Special packings in Nozzle and other parts exclude water.
- Corrosion resistant construction throughout.
- Easy on-the-spot Recharging (No tools needed).
- Quick, *positive* puncture operation.
- Special guard protects cartridge . . . rugged construction throughout.
- Ansul *"PLUS-FIFTY"*® Dry Chemical used exclusively.
- Field tested by thousands of satisfied customers.
- Ansul LT Models are the only dry chemical extinguishers listed by U.L. for operation at –65° F.



Ansul Wheeled Portable Models — 150-A and 350-A.



Ansul Mobile Units—Mine Cars, Trailers, Jeep Equipped and Fire Trucks.



Ansul Piped Systems and Stationary Units.

Send for File No. 702. You will receive a variety of helpful printed matter. Included is our latest catalog which describes Ansul Extinguishers of all sizes — from the small Ansul Model 4 to Ansul Piped Systems and Ansul 2000 lb. Stationary Units.

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CHEMICAL COMPANY
Fire Extinguisher Division
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CONVENIENT NEW ROOM MAKES CONFERENCES CLICK . . .

Begins on page 304

quarters, 330 West 42nd Street, New York. It's worth a trip to New York to see them. They're full of ideas for plant operating executives who want to come up with a multi-purpose conference room that will really do its job.

AMA surveyed more than 20 companies' conference rooms, consulted training experts in its 13,000-company membership, and did plenty of analyzing of its own experience, too. With all the ideas in, AMA's Ed Mallot, with President L. A. Appley and Secretary J. O. Rice, put them all together. Here are some of their brain children that you may be able to put to use:

General Layout • There are five conference rooms in all. Each is 16 x 20 feet, with walnut paneling on two walls, soundproof ceilings, air conditioned throughout. There's also a lounge, big enough to accommodate 80 people, around which the conference rooms are arranged. The lounge has two purposes. It's the general meeting place of seminar groups when meetings are over or in recess. In addition, it can be used for larger group meetings, when something comes up that is of special interest to more than one seminar group.

Conference tables • AMA ended up with giant rectangular conference tables, 7 x 14 feet. After looking into all the strange shapes in which such tables have been made (kidney-shaped, trapezoids, "U's," and triangles) they decided the rectangle was the best for its purposes. Reasons: the rectangle gets everybody facing everybody else directly. This encourages free exchange of ideas. And you get the most for the space, an important point, since the rooms had to be limited to over-all 16x20-ft. dimensions.

Tables are supported from the center, so there aren't any jutting table legs to interfere with con-

NOT WANTED

X-RAY

Good only for scrap. That's the fate of an imperfect casting. No one wants it, but *someone has to pay* once expensive machining has been started.

That's why leaders in industry are placing confidence in radiography. A vital inspection tool for detecting internal discontinuities prior to finishing operations. Before the ledger grows red with costly machining.

As an inspection device, industrial x-ray is often a non-destructive substitute for physical test and sectioning. But its applications are far broader. In fact, industrial x-ray has become a *development* tool. An instrument that not only diagnoses, but suggests treatment as well. It shows where savings can be made, designs improved.

Write for booklet "Industrial Application of the X-Ray". X-Ray Department, General Electric Company, Room AC-11, Milwaukee 14, Wisconsin.

GENERAL ELECTRIC

PERFECTED TAPER makes the difference in American Wedgbelt Sheaves!

A few turns of just three set-screws and any American Taper-Bushed Wedgbelt Sheave is INSTANTLY TIGHT or QUICKLY RELEASED. American "perfected-taper" Sheaves and American Wedgbelts combine for perfected performance!

• Quiet • Vibration-Free • Long-Wearing Grooves • Maximum Pulling Power • Minimum Belt Stretch • Long Belt Life

Available from stock. Call your nearby American Distributor.

AMERICAN WEDGBELT DRIVES

Perfected Taper Makes The Difference

The American Pulley Company 4210 Wissahickon Avenue • Philadelphia 29, Pa.

CONVENIENT NEW ROOM MAKES CONFERENCES CLICK . . .

Begins on page 304

ferees' feet. For AMA's purposes, tables seat only 17 people—the limit for any seminar. The space is ample, however, so 20 could easily be accommodated.

Lighting · There are two main sources of light. Recessed fluorescent fixtures throw working light directly on the conference tables. But during rest periods or lunches (which can be served right in the rooms) a more subdued light is provided through fluorescent fixtures around two sides of each room. Fixtures are completely hidden by dropped baffles, and light is diffused by reflection from walls. This plan also gives good light for display materials that can be hung from suspended fasteners along lighted walls. All lights can be controlled from a simple master switch from the front of room.

Convenience of conferees · For hats and coats, conference rooms have sliding door closets, built into one cabinet wall. This wall also has a battery of small individual compartments for notebooks, papers, briefcases, and small personal property. Compartments open at finger-tip touch by means of ingenious pressure catches.

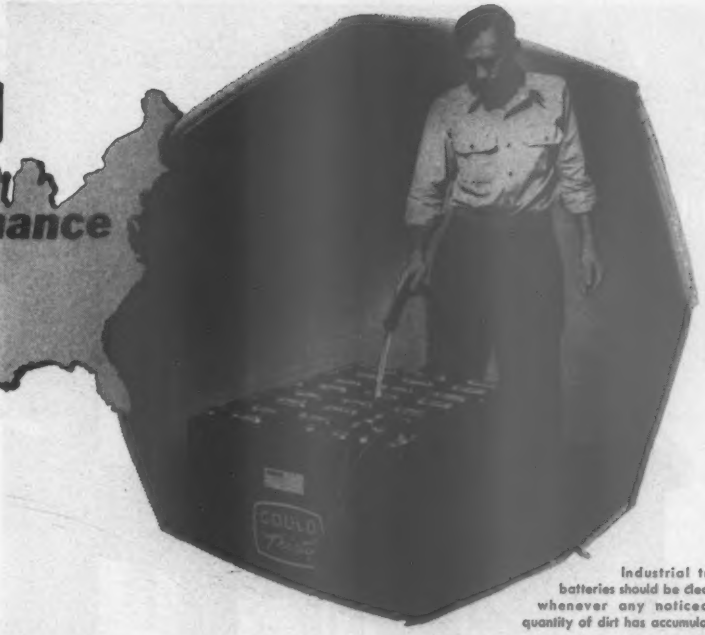
Another cabinet-wall feature is a combined pass-through and storage section for coffee and soft drinks. Attendants can put refreshments in from outside the rooms, and those inside can open up a panel, and help themselves as they want. This isn't something to decide you don't want in your plant until you've really thought about it a bit. May have some real value in long sessions.

Teaching aids · Here's where AMA's set-up really shines. One entire end of each room is designed to make it easy to lead conferences. Everything is concealed behind hinged panels (see photograph).

Hinged panels open out and provide support for three sets of flip-flop charts. These can be

GOULD

Plus-Performance Plan



Industrial truck batteries should be cleaned whenever any noticeable quantity of dirt has accumulated.

GIVES YOU

THIS TIMELY TIP—

CLEAN BATTERIES LAST LONGER!

Because battery cleanliness prevents external current leakage and grounds, regularly scheduled cleaning is essential for maximum battery service. Information on proper battery maintenance is available to you through the GOULD PLUS-PERFORMANCE PLAN—a complete system of manuals, articles, specifications, bulletins, charts and graphs dealing with this and practically every other battery problem.

GOULD PLUS-PERFORMANCE PLAN material tells you and shows you how to select, charge and handle, maintain and determine the condition of your batteries . . . and it's FREE, without obligation! Use it and you can extend battery service as much as 50%! Send today for booklet explaining the plan.

The Gould "Thirty" with "Z" Plates—America's Finest Industrial Truck Battery

HERE'S HOW TO CLEAN YOUR BATTERIES

Batteries should be kept clean and dry. When cleaning be sure all vent plugs are in place and tight. Wash batteries with water, then blow off excess and dry with compressed air. Neutralize acid on covers and other parts of the battery with ammonia or baking soda at least once a month. Terminals and connectors should be cleaned with baking soda and water.

During cleaning, observe condition of steel tray and, if corrosion is evident, wash and paint tray with asphaltic, acidproof paint or melted battery-sealing compound.

GOULD

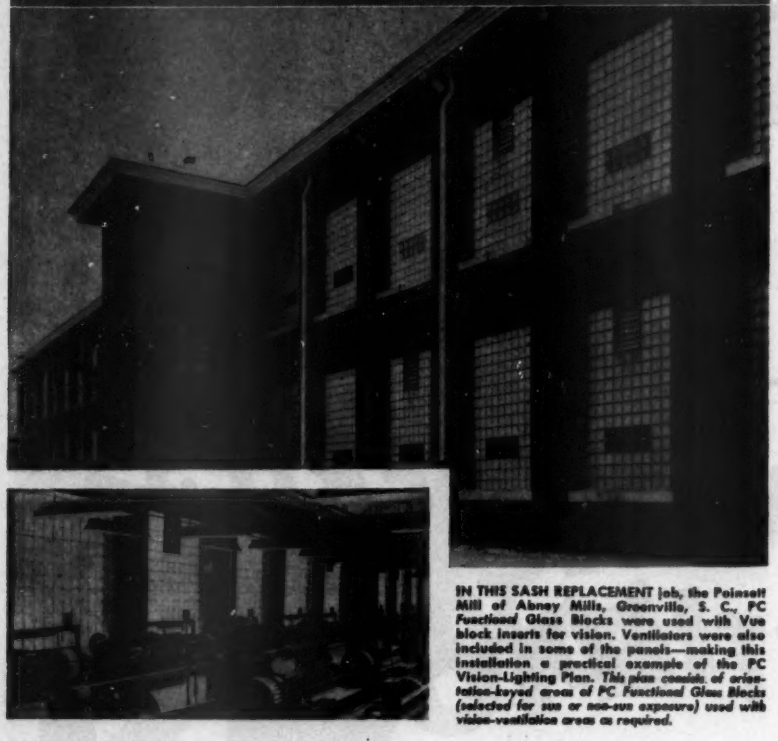
STORAGE BATTERIES

GOULD-NATIONAL BATTERIES, INC., TRENTON 7, NEW JERSEY

Always Use Gould-National Automobile and Truck Batteries

Improve working conditions...
Effect operating economies...

with PC GLASS Blocks for sash replacement



IN THIS SASH REPLACEMENT job, the Poinsett Mill of Abney Mills, Greenville, S. C., PC *Functional* Glass Blocks were used with Vue block inserts for vision. Ventilators were also included in some of the panels—making this installation a practical example of the PC Vision-Lighting Plan. *This plan consists of orientation-keyed areas of PC Functional Glass Blocks (selected for sun or non-sun exposure) used with vision-ventilation areas as required.*

● Replacing old, inefficient sash with modern, handsome PC Glass Blocks makes more usable space available by admitting more daylighting over wider working areas. Workers are therefore more comfortable; eye fatigue is reduced; production is bettered. And PC Glass Blocks reduce heating and air-conditioning costs, because they have more than twice the insulating value of ordinary, single-glazed windows. Besides, they rarely need repairs or replacements. There's no periodic and expensive painting and puttying. Involving no critical materials, they are immediately available. Send the coupon for additional information on PC Glass Blocks.

PC Glass Blocks are immediately available ...no construction delays!

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The mark of a modern building

Distributed by Pittsburgh Plate Glass Company; W. P. Fuller & Co. on the Pacific Coast; Hobbs Glass Ltd. in Canada; and by leading distributors of building materials everywhere.

CONVENIENT NEW ROOM MAKES CONFERENCES CLICK . . .

Begins on page 304

blank for writing by conferees, or can hold prepared charts. No more worry about easels! Opening panels reveals a sliding corkboard on which exhibits can be thumbtacked. In back of this board is a modern chalkboard, made of green composition glass.

Other panels in the end wall conceal a bookcase, storage compartment, light-switch system, and telephone. The telephone may, if desired, be used to "broadcast" to all rooms through public address loudspeakers.

For projecting films and slides, there's a built-in screen that pulls down from the ceiling. And AMA is now planning to hook its amplifiers right into the built-in P. A. speakers in each room.

How AMA will use seminar rooms · AMA's sponsorship of small seminar discussions two years ago was strictly an experiment. Results were phenomenal, demonstrated that operating executives in business and industry knew what they wanted and would jump at the chance to get it. What they wanted, it turned out, was the chance to get together, thrash out common problems in great detail, and spark ideas off one another.

Seminar sessions have been no pushover for those attending. Sessions last three solid days, with little time out for "breathers." Now AMA is making them even tougher with a new plan for "multiple unit," and "advanced study" seminars.

The original plan for single 3-day seminars will go right on. The new programs are in addition to what has been offered to date.

The new plans will develop topics progressively. For example, a seminar on collective bargaining and contract administration will discuss new developments in collective bargaining (November 28-30), planning and conducting the negotiations (January 23-25), and day-by-day administration of the contract (April 23-25).

Let's go...let's get that SCRAP in!

All your SCRAP is urgently needed, NOW

THE scrap shortage is serious. *Your* scrap—every pound of iron and steel scrap you can locate in your plant or factory—is vitally needed and needed right away. For unless you do everything possible to get this scrap on its way to the mills, steel production is bound to slow up. That can't be allowed to happen. But without your help it surely will.

It takes at least one-half ton of scrap to make one ton of steel. With the mills turning out more than 2 million tons of steel per week, over 1400 carloads of industrial scrap are needed *every day*. And industry, somehow, must provide it.

What you can do to meet this emergency

First, organize a permanent Scrap Salvage Committee and make the "drive-for-scrap" part of your daily operations. Search out every possible source of scrap. Turn your old and worn-out equipment, tools and machinery over to your scrap dealer, at once. Dig out your discarded dies, rusted-out tanks and boilers, your old rails and other miscellaneous junk, and start them back to the mills through your scrap dealer. Encourage every employee to report every retired or obsolete machine that now stands idle—see that it is turned in for scrap.

By getting this "dormant" scrap off your premises and into the furnaces you'll be helping not only yourself but America as well. *More* scrap turned in, means *more* steel turned out—it's as simple as that. So let's get going.

You'll find your local scrap dealers listed in the yellow pages of the phone directory.

This page would ordinarily be used to tell you about

U·S·S STAINLESS STEEL

but, because without SCRAP we cannot produce steel, we are asking instead for your all-out help in getting more SCRAP to the mills.

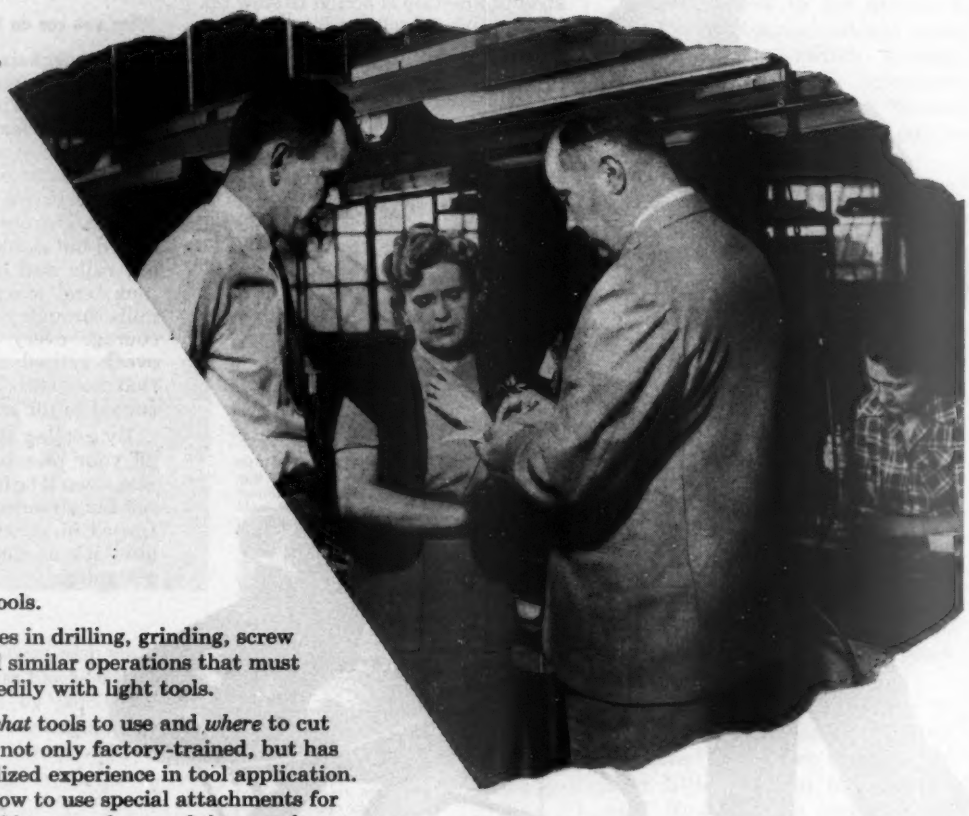
AMERICAN STEEL & WIRE COMPANY, CLEVELAND
COLUMBIA STEEL COMPANY, SAN FRANCISCO · NATIONAL TUBE COMPANY, PITTSBURGH
TENNESSEE COAL, IRON & RAILROAD COMPANY, FAIRFIELD, ALA. · UNITED STATES STEEL COMPANY, PITTSBURGH
UNITED STATES STEEL SUPPLY COMPANY, WAREHOUSE DISTRIBUTORS, COAST-TO-COAST
UNITED STATES STEEL EXPORT COMPANY, NEW YORK

USS

1-1328

UNITED STATES STEEL

Can you hire this man?

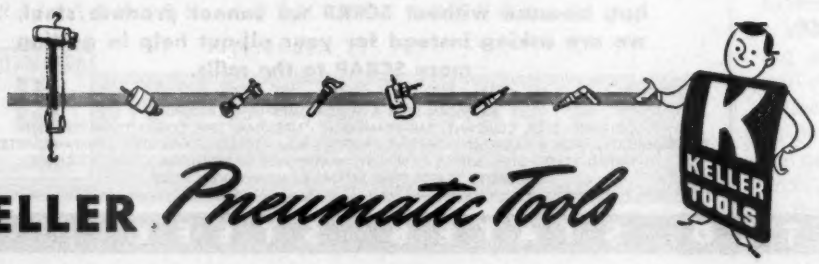


He knows tools.

He specializes in drilling, grinding, screw driving, and similar operations that must be done speedily with light tools.

He knows *what* tools to use and *where* to cut costs. He is not only factory-trained, but has long, specialized experience in tool application. He knows how to use special attachments for unusual problems, and can advise you how to make them.

You can put him on your staff at once . . . but NOT on your payroll . . . because he is the application engineer at the Keller office near you. His service doesn't *cost* money—it *saves* money. It will pay you to call him.



KELLER *Pneumatic Tools*

KELLER TOOL COMPANY
GRAND HAVEN, MICH.

Take a "BIG BITE" out of Power Costs

Put cost-cutting teeth in your V-Belt drives with DAYTON COG-BELTS*

★ 40% MORE H. P. PER BELT ★ FEWER BELTS
★ FEWER PULLEY GROOVES ★ LONGER BELT LIFE

Costs of power transmission come tumbling down with the premium Dayton Cog-Belt. Original cost is less. 5 Dayton Cog-Belts with rayon cords do the work of 7 ordinary V-Belts.

You save drive space. Cog-Belts let you use shorter center-to-center pulley distances — as much as 25% shorter.

Cogs are the only V-Belts scientifically built to bend, like your finger. They withstand flexing and compression strains better, run cooler, last longer.

To save money and drive space, get Dayton Cog-Belts. Ask your Dayton Distributor.

"Cog-Belts on the ball!" says Maintenance Man

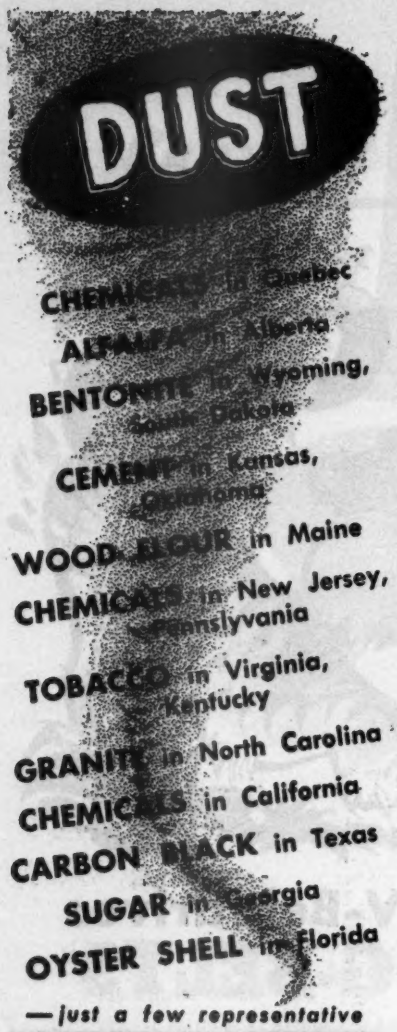
Swedish ball grinders were chewing up steel cable V-Belts in 4 to 5 weeks. Reasons: small motor pulleys, and oil. Dayton BX60 Cog-Belts were tried on one machine, *more than doubled* best previous belt life. Now Cogs drive all the ball grinders. "Cogs are really on the ball!" says the company engineer.

DAYTON RUBBER COMPANY, DAYTON 1, OHIO

V-Belts by **Dayton Rubber**

*T. M.

WORLD'S LARGEST MANUFACTURER OF V-BELTS



—just a few representative dusts collected in thousands of

SLY

DUST FILTERS

• Sly pioneered and leads in industrial dust control.

Sly representatives are trained and experienced engineers.

Your dust problem, large or small, can be solved by a Sly dust expert.

THE W. W. SLY MANUFACTURING CO.
4755 Train Avenue • Cleveland 2, Ohio
New York • Chicago • St. Louis • Philadelphia
Detroit • Minneapolis • Birmingham • Cincinnati
Los Angeles • Rochester • Toronto

LETTERS TO THE EDITOR

Reading Tests Coming Monthly

Dear Editor:

Your article, "How to Read Faster and Better," in the October, 1951, issue appealed to me so much that I suggest that a test similar to it be included in each issue for at least a year.

RAYMOND S. OWEN

RAYMOND S. OWEN, MANAGEMENT ENGINEERS
CHICAGO, ILL.

• *We are accepting Mr. Owen's excellent idea. Starting in the December issue, we'll publish a test each month, plus answers and scoring key.*—THE EDITOR.

"Who's to Blame for Sloppy Maintenance"

Gentlemen:

"Who's to Blame for Sloppy Maintenance" [FACTORY—June, 1951, p. 100] certainly deserves wide reading and distribution.

The biggest cost of maintenance is "down for repairs" time.

That is money down the sewer, for in no way can production be made up by speeding up machine to make up the "down time," which may run from an hour to days or weeks. Here is the greatest loss, and we have preached for years the use of "machine-hour charge"—and that every hour lost in repairing equipment should be charged to the repair department.

By doing that, the master mechanic would have something in figures to back up his arguments. Then the front office would be forced to look at figures like $100 to $1500 an hour charged against repair and maintenance for lost production. They would wake up. They'd stop the loss mighty fast.

Lost production runs into real money—beside the cost of the idle time of the operator or operators of the machine. So many times the "front office brains" have put up the silly argument: "You won't use this (equipment) enough to pay for it in a year." If the same "brains" put up that argument for fire insurance, they'd be out of a job for the rest of their lives. Firms pay fire insurance for years, just to be protected against *one* fire.

Try to tell them that just *one* job, while down for repairs, will cost many times more than one tool like ours, and they get up on their high horse and feel that you are insinuating that they have no brains.

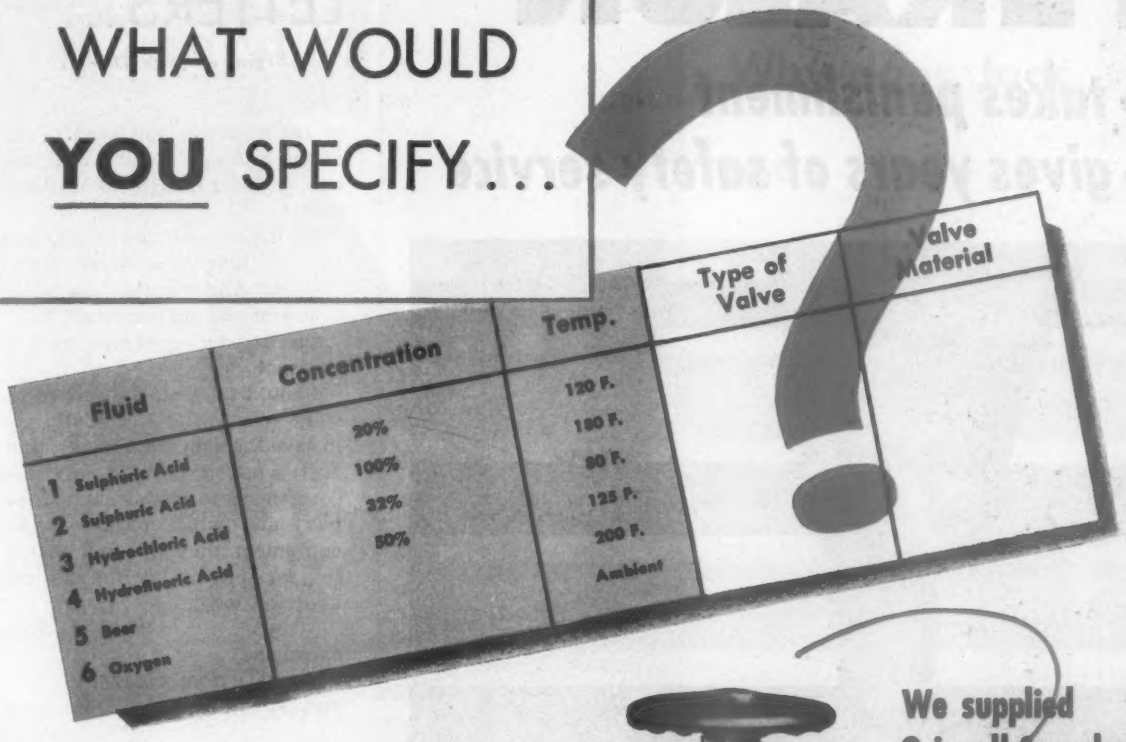
From our experience with many of these "executives," they sit on their brains. They really "execute" many good money-saving ideas, just because they think they have to show they are saving money by not buying a blasted thing to save money or time.

Purchasing agents are offenders. For, many times, they cost their companies more than they get paid or are worth by the asinine notion that their chief job is to save money by not buying anything.

It's a funny paradox—and the Army "snafu" is the only comparable situation—but the "big brass" will put a man in charge of plant repairs, and pay him a good salary as a master mechanic, and then veto every time- or labor-saving idea he puts forth.

For example, one case I know of: The master mechanic drew $15,000 a year. For two years the purchasing agent and the "big dome" kept careful records of everything he wanted to buy to save them money, speed production, and cut down in-plant costs

WHAT WOULD **YOU** SPECIFY . . .



Fluid	Concentration	Temp.	Type of Valve	Valve Material
1 Sulphuric Acid	20%	120 F.		
2 Sulphuric Acid	100%	180 F.		
3 Hydrochloric Acid	32%	80 F.		
4 Hydrofluoric Acid	50%	125 F.		
5 Beer		200 F.		
6 Oxygen		Ambient		

In several of these cases other body materials or diaphragms would serve as well. But the really important fact is the unmatched versatility of Grinnell-Saunders Diaphragm Valves in handling corrosive fluids, gases, compressed air, food and suspended solids . . . in lines where corrosion, abrasion, contamination, clogging, leakage and maintenance are problems.

Grinnell-Saunders Valve bodies are stocked in cast iron, malleable iron, stainless steel, bronze, and aluminum, with other materials available on special order. Valve bodies can be lined with lead, glass, natural rubber or neoprene. Diaphragms are available of natural rubber and a number of synthetics to suit particular service conditions.

The Grinnell-Saunders Valve Division will be pleased to submit recommendations upon receipt of complete information covering service conditions.

We supplied Grinnell-Saunders Diaphragm Valves with . . .

Body Material	Diaphragm Material
1 Rubber lined	Natural rubber
2 Cast iron	KEL-F
3 Glass lined	Butyl
4 Magnesium	KEL-F
5 Polished bronze	White diaphragm
6 Cast iron*	Neoprene

*For oxygen service a high flash point lubricant is supplied. All valves for oxygen service are subjected to 300 lb. air underwater test.

Features of the Grinnell-Saunders Diaphragm Valve

- diaphragm absolutely isolates working parts from fluid
- diaphragm lifts high for streamlined flow in either direction
- diaphragm presses tight for positive closure
- body, lining and diaphragm materials to suit service
- simple maintenance—diaphragm easily replaced

GRINNELL

WHENEVER PIPING IS INVOLVED

Grinnell Company Inc., Providence, Rhode Island • Sales Offices and Warehouses in Principal Cities

pipe and tube fittings • welding fittings • engineered pipe hangers and supports • Thermolier unit heaters • valves Grinnell-Saunders diaphragm valves • pipe • prefabricated piping • plumbing and heating specialties • water works supplies industrial supplies • Grinnell automatic sprinkler fire protection systems • Amco humidification and cooling systems

FERALUN

• takes punishment
• gives years of safety service

AB 107

Yes, Feralun treads, floor plates and thresholds take the pounding of heavy traffic in stride because this economical flooring material is *cast to last!* No matter where you put Feralun—on stairs, steps, walkways or ramps—it assures two-fold benefits:

1 It protects against slips and falls.
2 It keeps doing this vital safety job for the life of the building.

Reason? Feralun consists of a special cast iron matrix with a diamond-hard abrasive imbedded in the walking surface. Gripping action is provided by the abrasive, not by the scoring or indentations in the metal. ● Get the full story on Feralun. Find out why millions of feet of this long-lasting anti-slip flooring are now in use.

BULLETIN 4k Am *contains complete data* WRITE TODAY *for your copy*

AMERICAN ABRASIVE Safety Floorings

AMERICAN ABRASIVE METALS CO.
460 COIT STREET, IRVINGTON 11, NEW JERSEY

LETTERS...

Begins on page 314

of maintenance and repair. One of these things they "saved" was one of our ₵3 angle tool attachments.

At the end of two years, they showed him how much they'd "saved." And was the "big dome" proud of his achievement!

The master mechanic quit on the spot.

I could tell you the rest of the story—just what it actually cost to save the firm from bankruptcy. Just what it cost to buy new equipment, to modernize and repair, and what machinery and equipment they did not have to sell for scrap iron. But it would take too long.

CHAS. A. KOZA
PRESIDENT
INVINCIBLE TOOL COMPANY
PITTSBURGH 22, PA.

"Why Not an Idea-Reporter . . . ?"

Dear Mr. Waddell,

Re: "Why Not an Idea-Reporter in Your Plant?" [FACTORY, August, 1951, p. 67]

You've hit the target right on the button. . . .

To put a tip on that arrow of yours: The idea is no good if you don't find the *right reporter*. Chances are 100 to 1 that a trained "outsider" in a thorough examination of a plant will come up with more worth-while ideas than all the rest of the plant personnel put together.

That's why we say to our "suspects" that the value of outside, trained eyes is worth more than all the "resident" men cost the company over the years (in "seeing" things, we mean).

I like FACTORY because it ditches theory and preaches practical horse sense.

R. M. MUCH
R. M. MUCH AND ASSOCIATES, INC.
BOSTON

Why does Jack use the back door?

BRAINARD STRAPPING TOOLS, like the one husky Jack Griffin of Rochester and Syracuse carries here in his left hand, are often worth their weight in gold to some strapping user to keep production rolling.

On rush occasions like this, Jack gives the order personal delivery—right on through the shipping room door. Once there, he sticks with it until things are running smoothly.

Jack used to play a lot of football at Niagara University, got in the habit of tackling problems head on. Locating a replacement tool for a customer in a jam, giving personal follow-through, bringing out factory experts for technical advice don't rate as unusual in the eyes of Jack Griffin and his fellow Brainard Strapping System representatives.

To them it means service. To you it means dependability. Brainard representatives are located throughout the U.S.; in Canada, P. J. McArthur Company, Toronto.

COMPLETE STRAPPING SERVICE. LIGHT AND HEAVY DUTY STRAPPING, TOOLS AND ACCESSORIES

Brainard

SHARONSTEEL

WRITE: STEEL COMPANY STEEL STRAPPING DIVISION, WARREN, OHIO

picture of a Plant Manager without a wiper worry in the world

HE USES KEX INDUSTRIAL WIPING TOWELS!

No frantic telephone calls during the day trying to find wiping material for him. No loss of sleep at night worrying about it.

He has KEX*—a steady, reliable source of high quality industrial wiping towels coming into his plant regularly, neatly bundled, and in just the quantity he needs.

Lucky? Not a bit—he's just smart!

He decided no makeshift Wipers for *his* plant! He wanted to save time, money and worry by having the best. So he discovered that KEX towels are super-absorbent, softer, uniform in size, hygienically clean and made for orderly shop housekeeping. He also went for the fact that a percentage of KEX towels is printed with safety slogans.

So if wiping problems are giving you headaches—and sleepless nights—look up the KEX distributor in your classified telephone book. There's nothing to buy, just a low rental service per month. Better do it right away, though. Everybody's getting the KEX idea.

"KEX" NATIONAL SERVICE

*REG. U.S. PAT. OFF.

295 Fifth Ave., New York 16, N. Y.

BEHIND THE BYLINE

Meet some of the men in industry who wrote articles for this issue of FACTORY.

JOSEPH M. GAMBATESE is an old friend to FACTORY'S readers. He writes "Looking Ahead in "Labor," (before page 81), regular monthly last-minute roundup. This month Joe doubles in brass as the writer of our feature article (page 84) on wage control policy —who makes it, how good it is.

Joe has covered Washington labor news for FACTORY during half of the 10 years that he has specialized in labor reporting. Among FACTORY'S staff, he's known as the "man who knows everybody."

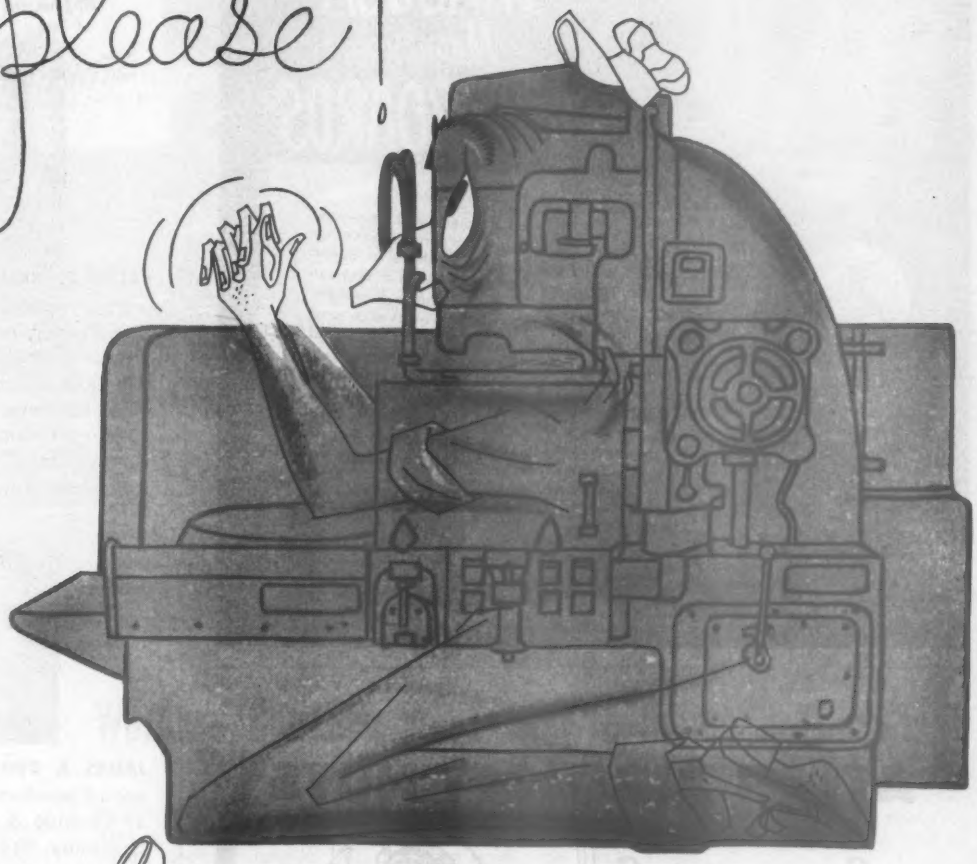
He's a familiar figure at major labor conventions and Congressional debates on labor measures. His news contacts include big names in industry, labor, and government. And he's a personal friend of people like Ohio's Governor Lausche and Price Stabilizer DiSalle.

Joe's a recognized expert in two other fields—industrial relations and golf. He's lectured on the former at industrial relations conferences, and wrote the chapter on social security in Carroll W. Boyce's book, *How to Plan Pensions*. As for golf, Joe was hot enough in 1946 to win the National Press Club title. No laurels of late, though.

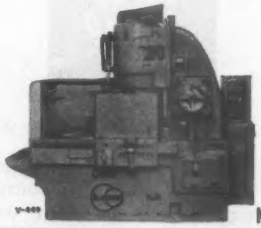
"Having trouble with another local golfer, fellow named (Secretary of the Army) Frank Pace. Always nips me by a stroke or two," says Joe.

Turn the page

please!



Blanchard builds good surface grinders. They are precision machines and also rugged — built to last! Properly maintained, they will grind parts quickly and accurately for many years. Now, when the urgent demands of defense industries are lengthening delivery dates on new Blanchard grinders, it is vitally important that you take good care of the Blanchards you now have. When operating on two shifts, machines should be cleaned, oiled and greased twice as often — on three shifts, three times as often! Complete maintenance instructions are shipped with every new Blanchard grinder. If you would like an additional copy, just drop us a card giving the serial numbers of your grinders. Taking good care of your Blanchards will enable them to take good care of you!



NO. 18 BLANCHARD SURFACE GRINDER

Send for your free copies of "Work Done on the Blanchard," fourth edition, and "Art of Blanchard Surface Grinding."

PUT IT ON THE BLANCHARD

THE BLANCHARD MACHINE COMPANY

64 STATE ST., CAMBRIDGE 39, MASS., U.S.A.

Cut materials handling costs with

MAGCOA Magnesium DOCKBOARDS

Magcoa Magnesium Dockboards are proving the perfect answer to freight car and truck loading problems in every type of industry. One man can position it without the aid of truck, chain or hoist because it weighs ¼ as much as steel ramps of equal size and strength. Hand holds in each corner of the special quarter round safety curb permits ease of handling.

Beveled edges and bend angle keeps Dockboard flush with floor and dock. Slipping out of position is impossible due to safety span designed to application requirements. Put completely modern Magcoa Dockboards to work for you . . . they'll take the load out of your carloading operations.

Representatives in All Principal Cities

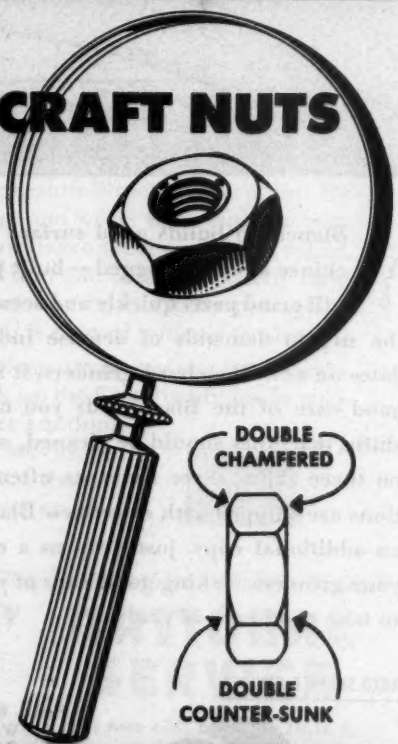
DIVISION OFFICES

30 Rockefeller Plaza, New York 20
Rex Bldg., San Francisco 4
7657 Mallard St., Houston
8922 W. 25th St., Los Angeles
8701 South Hampton Ave., Philadelphia
1025 Connecticut Ave., Washington, D. C.

MAGNESIUM COMPANY of AMERICA East Chicago, Ind.

ATLAS AIRCRAFT NUTS

free of Burrs



Precision-made Atlas aircraft nuts are free of burrs . . . double chamfered, double counter-sunk, too. Manufactured to meet AN specifications, they are available in steel, brass and stainless.

• Write today for prompt quotations, giving your detailed requirements.

AT-118

ATLAS SCREW & SPECIALTY CORP.
450 BROOME STREET • NEW YORK 13, N. Y.

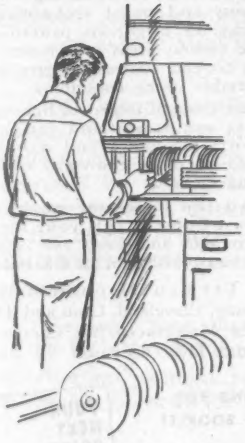
BEHIND THE BYLINE

Begins on page 318

RALPH P. KREUTER, before entering personnel relations, was a bookkeeper, accountant, and machinist—useful background for time and motion study (page 94). He has been with Hand Knit Hosiery Company for 20 years, the last six of them as Director of Industrial Relations.

JAMES J. DUGGAN, superintendent of mechanical and fire safety at Carbide & Carbon Chemicals Company, has been a specialist in fire prevention design, fire control, and fire research for 17 years. He's authored several articles on fire prevention and protection, writes on page 100 about testing heat - resistant paints.

R. E. GILKS has been with Willard Storage Battery Company 37 years. Now assistant works manager at the Cleveland plant, he's largely responsible for the company's palletization system (page 124).



Workers Can See What They're Doing In This Plant

Production men know that good factory lighting steps up production, cuts down spoilage, improves employee morale. But, to correct inadequate lighting, many plants merely increase the footcandles of light intensity—and think they've solved the problem. Actually, *too much* light . . . or glare from bare fixtures . . . can be as harmful as insufficient light. To get best results from plant and worker, light must be adequate *and* comfortable.

Day-Brite designs industrial lighting fixtures which give *both* adequate and comfortable light. In the Day-Brite lighted plant shown above, you can see clearly and without strain . . . without glare or shadows . . . in every part of the plant.

And — Day-Brite makes *only* quality fixtures which give years of trouble-free service . . . the lowest possible installation and maintenance costs. Proof? The hundreds of large American factories which use Day-Brite fixtures . . . and get complete satisfaction.

If *you* have factory lighting problems ask Day-Brite for help without obligation. Write to Day-Brite Lighting, Inc., 5441 Bulwer Ave., St. Louis, Mo.

**The upward component provided through the reflector apertures minimizes contrast between the fixture and the surrounding ceiling area, adding to the overall comfort of the complete installation.*

NOW, MORE THAN EVER

AMERICA MUST SEE WHAT IT'S DOING

IT'S EASY TO SEE WHEN IT'S

"DECIDEDLY BETTER"
DAY-BRITE
Lighting Fixtures

141

Commemorating a HALF CENTURY of DESIGNING and MANUFACTURING EFFICIENT CONVEYING SYSTEMS!

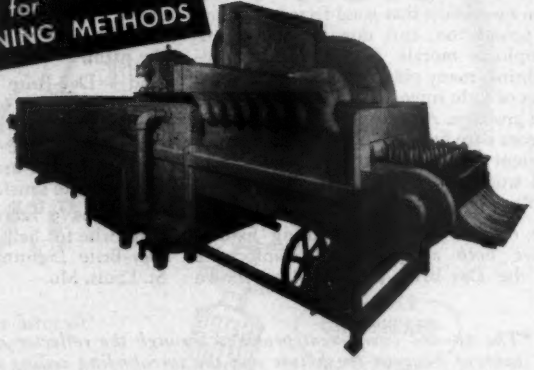
ALVEY-FERGUSON

The Efficient Way to Move Shells!

Pictured here is a unique, exclusive Alvey-Ferguson development—an A-F Combination Roller and Pusher Conveyor which takes shells from paint curing and storage to the melt loading building.

No power rollers are needed—the pusher is supported from a chain conveyor. Power, maintenance and handling are immeasurably reduced and production is increased to the maximum!

EFFICIENT DEFENSE PRODUCTION Calls for EFFICIENT CLEANING METHODS



This A-F Washing Machine was designed especially to remove grease from, and to dry shells before loading. A special feature is the automatic ejection of the shells. This A-F Washing Machine is an integral and vitally necessary part of the painting line.

Write for Information Regarding A-F Engineered Conveying Systems and A-F Washing Machines in War Plants and Arsenals

THE ALVEY-FERGUSON COMPANY

141 Disney St., the original . SINCE 1901 Cincinnati 9, Ohio

Offices or Representatives in Principal Cities

CONVEYING EQUIPMENT

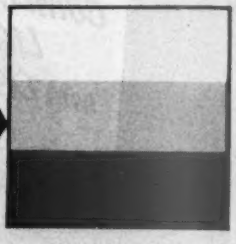
A-F CONVEYING MACHINERY

Alvey-Ferguson

WASHING MACHINES FOR INDUSTRY

TRY THIS TEST!

ISN'T THIS EASIER TO LOOK AT



THAN THIS ?

We think you'll agree that the top illustration is far easier on your eyes than the bottom one. This test is a simple demonstration of Tremco's *proved* interior painting system called Contrast Control.

Contrast Control, based on close collaboration between lighting engineers and paint technicians, regulates the brightness pattern of all the various areas in a room. It avoids extreme contrasts — provides comfortable seeing conditions.

Contrast Control improves lighting, reduces eye strain and fatigue, promotes efficiency and morale. It costs no more than any other painting method.

If you'd like to see the results of Contrast Control, call your local Tremco Man and *paint one room.* You'll be astonished at the difference.

The Tremco Manufacturing Company, Cleveland, Ohio and The Tremco Manufacturing Company (Canada) Ltd., Toronto.

SEND FOR FREE BOOKLET

"Your Next Paint Job," an illustrated 16 page booklet, contains a complete discussion of the principles of Contrast Control, as well as other matters of interest to anyone contemplating interior painting. Write for your copy.

TREMCO

PRODUCTS AND METHODS FOR BUILDING MAINTENANCE

UM-1011

Where DUST is a HAZARD

INSTALL FA DUSTITE PANELBOARDS

Above is a typical FA DUSTITE feeder panelboard, and below a FA DUSTITE lighting panelboard. Both are Underwriters Laboratories' approved for Class II, groups E, F, & G, Hazardous locations.

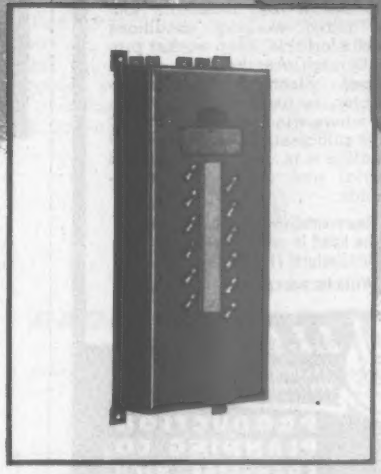
Similar vapor-proof (not explosion proof) type panelboards are also made by FA

. . . Here's maximum protection where volatile dust presents a hazard in the distribution of power and light. Regardless of external dust conditions, FA DUSTITE Panelboards provide safe, dependable performance because *they are dust-free inside.*

Dust is sealed out by means of welded hubs for conduit outlets . . . welded box corners . . . external mounting brackets . . . and a solid steel front plate with gasket protection all around.

FA Dustite panelboards are of the automatic circuit breaker type, which provide protection without a need for replacement of any parts. Circuit breakers are externally-operated by a Dustite mechanism of FA design. Handles operate through dustite bushings and engage the handle of the circuit breaker *inside* the cabinet. ON, OFF and TRIPPED positions are indicated on the front of the cabinet.

So don't take chances where dust is a hazard. Install an FA DUSTITE Panelboard. Should you want additional information, contact your nearest FA representative, listed in Sweets, or write for bulletin No. 302.



Capacities of FA DUSTITE Panelboards are 15 to 600 amps, 250 volts AC or DC and 600 volts AC main lugs only, or main circuit breaker.

FA TRADE MARK

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This wind-driven Allen Type "C" Turbine Ventilator, made of heavy-gauge coated iron or of special non-ferrous metals, displaces from 5,740 to 267,800 cu. ft. of air per hour, depending upon throat diameter of turbine, *at no cost*—the breezes supply the power! It's ventilation that gives maximum performance per dollar spent; economical to install and maintain, too. Helps make working conditions more comfortable, keep worker productivity high. Another type, motor-equipped Electro-Wind Turbine Ventilator, is available for use in areas where wind velocities are not always sufficient. Allen Engineered Ventilation is in use in thousands of industrial and commercial establishments.

- Representatives in principal cities are listed in our catalog in Sweet's Architectural File, Section 20b.
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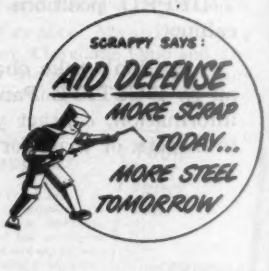
Feeling low about the steel situation?

Let us try to help you! Very frequently our experience will suggest a way out of your particular steel supply difficulty. We may have substitute materials or know of ways to stretch the supply of steel available to you. Call us *first* when you have a steel problem.



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★ *cut accidents and rejects*
★ *boost productive efficiency*

...with an RCA Industrial Sound System

Is your Plant Average Size?
If so, the SDC Dual Channel Console (at left below) will fill your needs. Serves from 10 to 60 speaker areas. May be equipped with AM-FM radio, 3-speed record player.

For larger plants, Custom Deluxe Dual Channel Console (at right below) serves up to 120 speaker areas. **Send for Free literature.**

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Now you can cut man-hour losses, boost morale, cut accidents and rejects, and boost productive efficiency . . . all quickly, easily, at low cost, with an RCA Industrial Sound System, already *proven* in hundreds of actual plant installations.

You'll get Easier Administration... instant voice contact with anyone anywhere in your plant. Finding key men or urgent shipments is quick and easy. And in emergencies, you're in full control for greater safety through voice coverage.

You'll get Better Morale . . . friendlier relations with your employees. Your warm, personal *voice* message via RCA Sound is far more effective than a printed bulletin.

You'll have Fewer Accidents, Higher Output through *work music* carried into all parts of your plant through RCA Sound. Exhaustive government tests have proved that "music-while-you-work" keeps your workers happy . . . lessens fatigue and boredom . . . reduces accidents and rejects. And noon-hour music brings restful relaxation, sends workers back to jobs refreshed. *Happy* workers are *steady* workers . . . less absenteeism and labor turnover. And bigger, better output . . . all through RCA Sound.

If You're Losing Out on all these *sound* benefits, join with the dozens of other profit-wise manufacturers who are ordering their RCA Industrial Sound Systems *now*. They've learned that no other plant investment costs so little, yet gives you so much in easier administration, better morale, fewer accidents, and greater productive efficiency *plus vital communications for emergencies*. Many are installing RCA Sound for its *emergency use alone*. For in these troubled times *your vital need for emergency communications is alone enough to justify the small cost of an RCA Sound System!*

You'll get Better Sound, too, from RCA, because RCA has pioneered sound systems for 26 years. Hundreds of industrial plants, schools, hospitals, airports, depots, ships and movie theatres are now using RCA Sound. Plant users have included such dollar-wise operators as Ford, General Motors, Bethlehem Steel, Douglas Aircraft, New York Central.

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Installation is simple, easy . . . like putting in telephones. And cost is surprisingly low... it quickly pays for itself through savings in time and man power, improvements in morale and production.

Send Coupon for Full Story—Mail the coupon for this big illustrated how-and-why book: "A New Industrial Giant" plus full information on what RCA Sound can do for *your* plant. Sound deliveries are still good . . . so act now. Remember . . . hundreds of other plants are already cutting man-hour losses, boosting morale, cutting accidents, and boosting production with *plant-proven* RCA Sound. You can too. Just mail the coupon . . . NOW.

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Eliminates Toxic Hazard of Solvents!

THE new portable Pangborn AC-4 Blast Machine scours armatures, parts, frames, coils, etc. in ⅓ the time of other methods. Material costs are reduced 90% and toxic or explosive solvents are eliminated.

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Solvent Method	$55.00	120 hrs.
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New Pangborn AC-4 Blast Machines use standard 40-pound air supply to remove oil and greases with blast of soft, 20-mesh corncob grits. No residue left on parts . . . no drying period.

FOR FULL INFORMATION, write today outlining your operation. Address: PANGBORN CORPORATION, 2100 Pangborn Blvd., Hagerstown, Maryland.

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BLAST CLEANS CHEAPER
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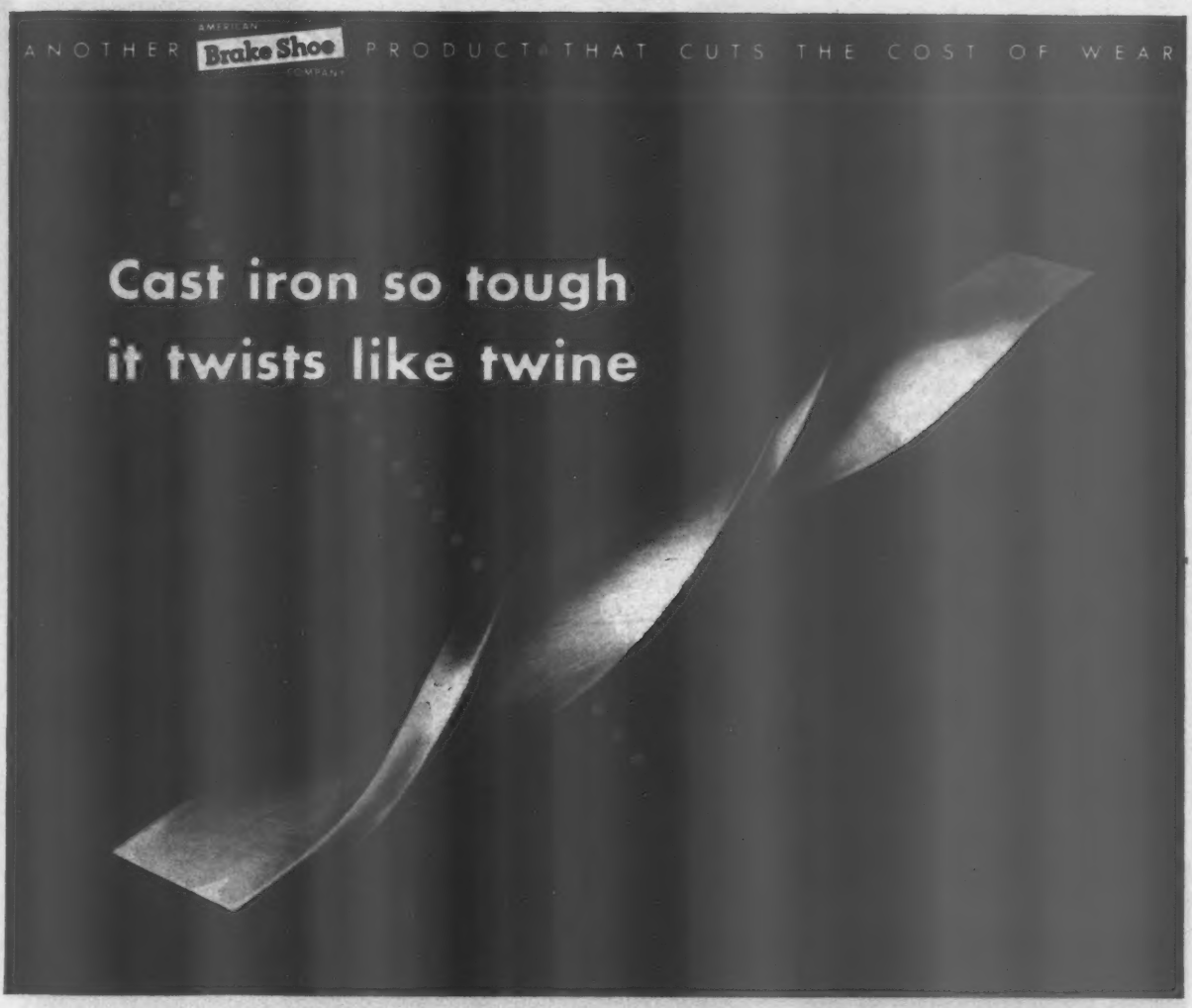

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The potential uses of ductile iron are nearly endless because it combines a wide range of properties with a competitive cost. Our engineers will be glad to work with you in finding how ductile iron may be applied to your problem. Write Department C American Brake Shoe Co., 230 Park Avenue, New York 17, N. Y. for literature on ductile iron.

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Cut-ability . . . that's the word for "Red End" Power Blades! *Cut-ability* that starts with special Simonds hack-saw steel, double checked for toughness and grain structure. *Cut-ability* that proves out *and pays off* on the job with straight fast cuts and *more cuts* per blade. Supplied in all standard sizes with a choice of these two types of steel:

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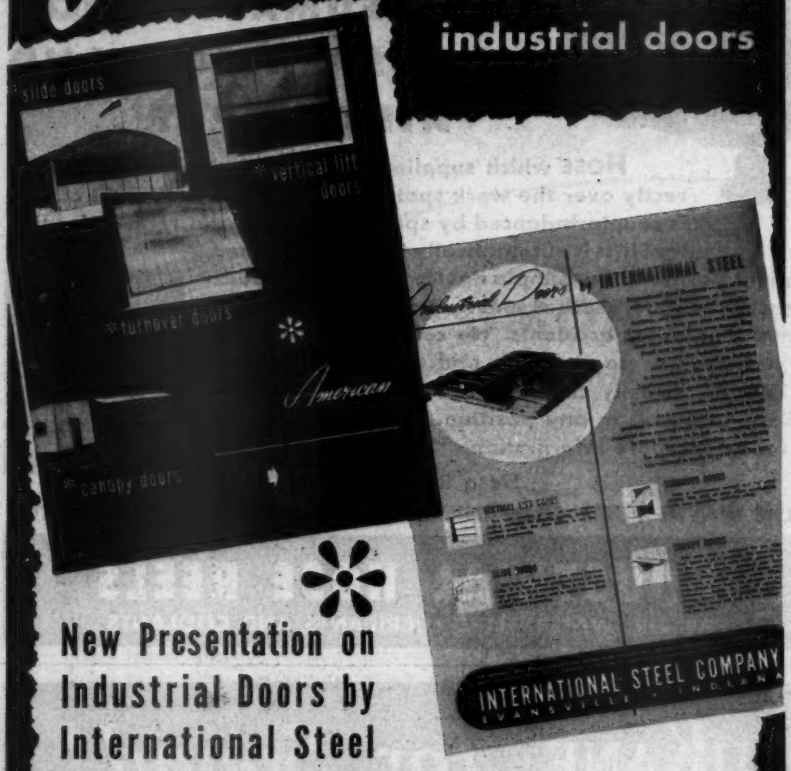
a quick review of the latest and best in industrial doors



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Industrial door design at International Steel moves ahead with the needs of American industry.

In a field where obsolescence is particularly great, with plant after plant handicapped by inadequate, inefficient, unsafe doors, International Steel brings wide experience and specialized engineering skill to meeting the most varied requirements in motorized and manually operated industrial doors of every size . . . up to the world's largest. International Steel's specialized know-how shows in low first costs . . . in doors that can often reduce your operating costs in many ways . . . in this new guide to the latest and best in industrial doors. Send for your free "Industrial Door Book" today.

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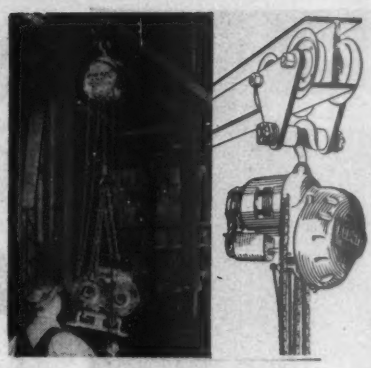

Wipes out

PRODUCTION HOLD-UPS

Bothered by production hold-ups in your plant and wondering how to get rid of them? A powerful little yellow 'Budgit' Electric Hoist — installed on your production, assembly, or inspection lines — will wipe them out in a hurry. Just give the 'Budgit' Hoist a try. See how it speeds up production to lower operating costs. How it saves your worker's energy — allows him to increase his daily output, once he is free from the drudgery of manual lifting.

'Budgit' Hoists will lift and move any load from 250 to 4,000 pounds speedily, efficiently, with the load under control at all times and with perfect safety for the operator. Here's a chance to cut compensation costs arising from the sprained backs, torn ligaments and muscles men get from physical lifting.

'Budgit' Hoists are a complete lifting unit in themselves — so, there's nothing to buy before you start lifting loads with them. No wiring, no conductor system, no installation costs — you simply hang them up where there are loads of lift, plug into the nearest electric socket, and use!

For more detailed information on how this fast-lifting hoist can help you, call the local "Shaw-Box" distributor or write us for Bulletin No. 391.

'BUDGIT CORD REELS increase the operating range of any make of hoist, portable tool, or mobile device having motors up to and including 1 H.P.

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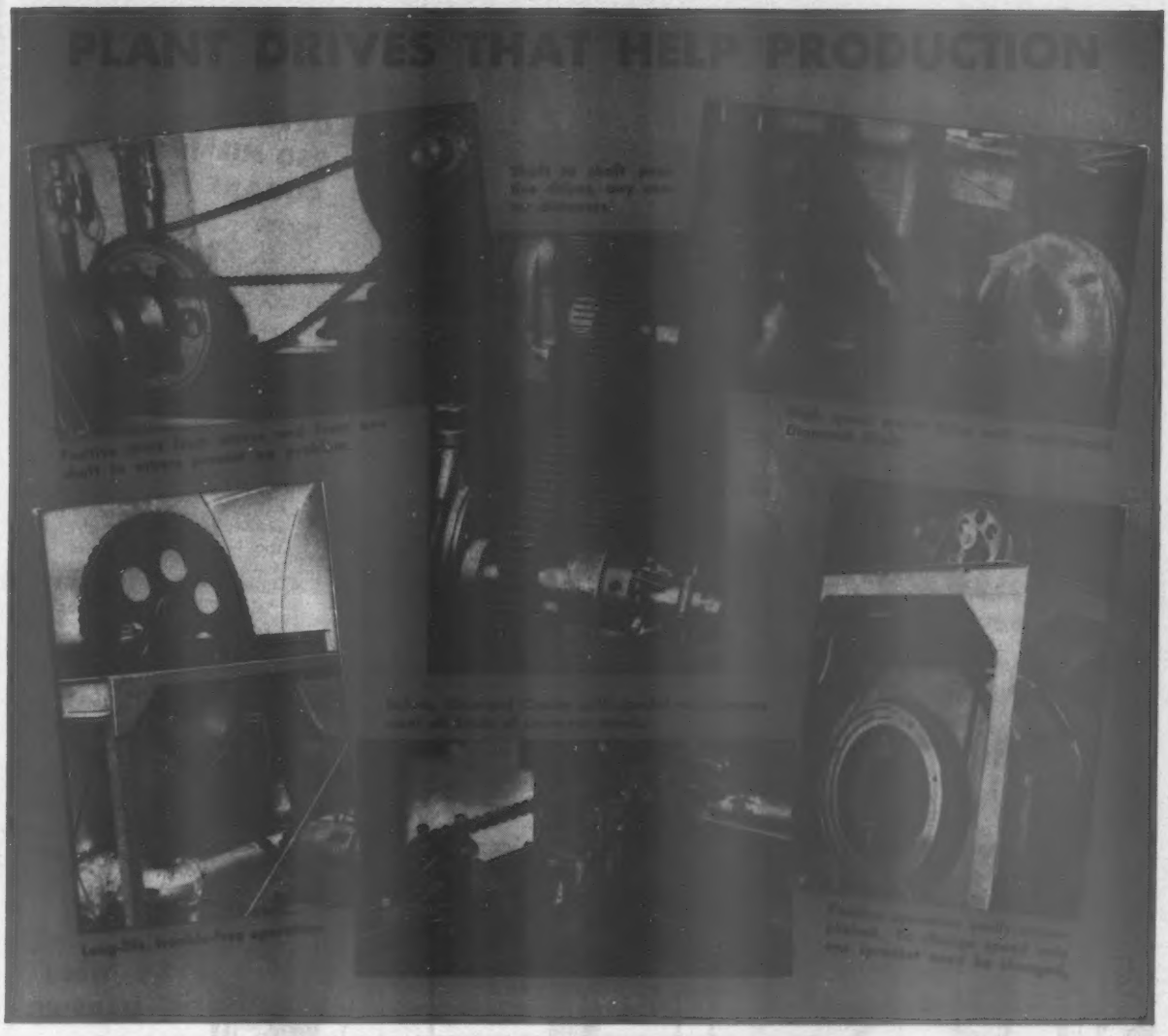
Builders of "Shaw-Box" Cranes, 'Budgit' and 'Load Lifter' Hoists and other lifting specialties. Makers of 'Ashcroft' Gauges, 'Hancock' Valves, 'Consolidated' Safety and Relief Valves, and 'American' Industrial Instruments.



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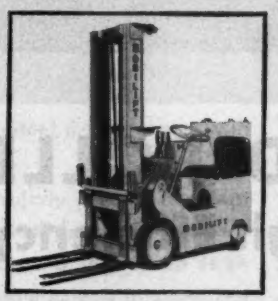
STAND-UP MODEL "E"

2,000-lb. cap. on 15" load center. Mast ht. 63" (Free lift 37"; Lift ht. 68"; Mast ht. extended 94") outside turning radius 57". Also available with 72" and 83" Mast.



SIT-DOWN MODEL "ER"

2,000-lb. cap. on 15" load center. Mast ht. 83" (Free lift 57"; Lift ht. 108"; Mast ht. extended 134") outside turning radius 63". Also available with 63" Mast.

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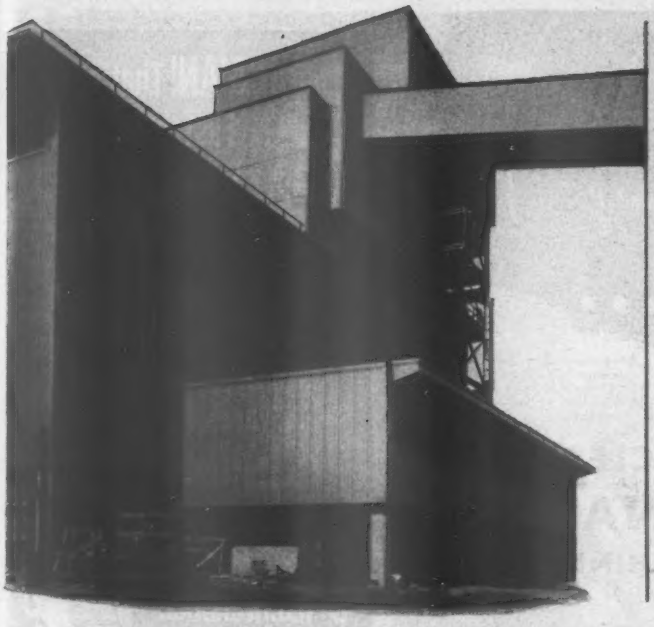

Another New Power Plant Conserves Heat-Saves Fuel . . .

with Carey INSULATION

Hawthorn Station, Kansas City Power & Light Company

This new steam-electric generating plant pours out a plentiful supply of cheap electricity for fast-growing industry and commerce, and thousands of farms and homes in the Company's Missouri-Kansas service area.

On the Missouri River in the Northeast Industrial District of Kansas City, Missouri, the new, modern Hawthorn Station has two 60/66,000 kw units in operation. An additional 90/99,000 kw reheat unit —to be ready for service late in 1952—will boost the utility's total generating capacity to a figure 103% greater than that of 1941!

Hawthorn Station, like *hundreds* of leading utility and industrial plants, installed Carey insulation products to save fuel and increase efficiency by minimizing heat loss. You cannot name a heat insulation problem that a Carey insulation product will not solve. And Carey's broad line includes *Super-Light* monolithic 85% magnesia in precision-sized blocks and "nesting O.D." pipe coverings that simplify installation, slash labor costs. Let Carey help you solve your heat insulation problems. Ask your Carey Industrial Sales Engineer for complete technical and application data—or, write to us direct.

Large pipe lines shown are 8" boiler feed discharge lines, carrying hot water from boiler feed pump to boiler drum. They are insulated with 2" thick Carey 85% Magnesia, finished with 8 ounce duck canvas. Small lines are 3" recirculating pipe lines, carrying water at 270° F., and insulated with 2" thick 85% Magnesia with 8 ounce duck canvas finish.

3", 4" and 6" pipes shown here carry saturated steam at a temperature of 350° F. to air heaters. They are insulated with double standard thickness Carey 85% Magnesia insulation.

The main steam header, carrying steam to the turbine at a temperature of 950° F., is a 12" pipe insulated with 2½" thick Carey Super-Light Monolithic 85% Magnesia over 2½" thick Carey Tempchek with sewn asbestos cloth finish.

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of "Industrial Insulation." Address Dep't F-11, The Philip Carey Mfg. Co., Cincinnati 15, Ohio. In Canada: The Philip Carey Co., Ltd., 277 Duke St., Montreal 3, P. Q.

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336* reasons why . . .

*Individual cutters on 16" Revo-tool accessory drum for model "K" Tennant Floor Machine. Available in various types and sizes.

YOUR FLOORS CAN BE CLEANED *FASTER* WITH A TENNANT INDUSTRIAL FLOOR MACHINE

When these alloy steel cutters, mounted on the spinning drum of a Tennant Floor Machine, bite into thick incrusted grime—small wonder it literally *vanishes!* Hardened grease and tar, granite-like cement splashes, thick accumulations of dried paint, chips, metal cuttings—all are sheared from floors by the high speed pulverizing action of the Tennant *Revo*-tool.

REMOVES ALL GRIME IN 1 FAST OPERATION

With this rugged, drum-mounted accessory on a powerful, heavy-duty Tennant Industrial Floor Machine, *one man alone* can clean any factory floor in a few minutes.

This operation cuts soilage loose and picks it up at same time . . . leaves floors clean, dry, ready for traffic . . . cuts cleaning costs . . . eliminates need for soap, water, chemicals or scraping . . . doesn't interfere with plant operation.

Available in gas or electric models for 12" or 16" drum accessories.

WRITE TODAY for new illustrated bulletins on Tennant Industrial Floor Machines for heavy industry applications. Specify 12" or 16" accessories; gas or electric power.

G. H. TENNANT CO.
2554 2nd STREET NORTH
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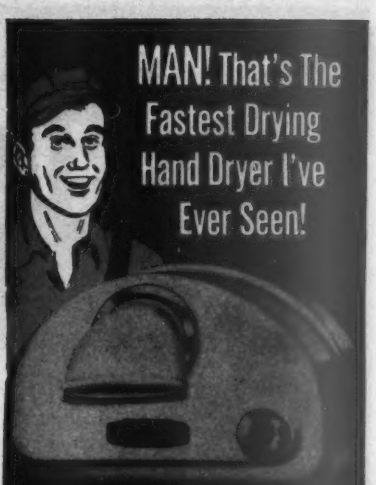
REVO-TOOL attachment pictured above. Ideal for heavy soilage.

WIRE BRUSH, 20, 30 or 39 ga. steel, diagonal pattern, won't clog nor streak.

STEEL WOOL roll for high-speed dry cleaning of wood floors.

Other drum accessories for sanding, polishing, scrubbing.



NEW *Sani-Dri* Brings You Basic Improvements Never Before Possible!

Amazingly fast drying time — plus the advantage of cleaner, more sanitary washrooms — make the New Sani-Dri popular wherever it is installed.

Now you can be sure of providing fast, efficient hand drying service . . . and save continuing towel expense. Saves washroom maintenance costs too! No empty towel cabinets to fill. No unsanitary waste containers to empty or become a fire hazard.

The new Sani-Dri is available in two models — No. 8-SWA Hand dryer for washrooms; and No. 8-SWH Hair Dryer for Shower rooms, pools, etc. Both models are easily mounted to the wall and carry the Underwriter's Seal of Approval. Investigate this new faster-drying Sani-Dri today!

ONLY SANI-DRI ELECTRIC DRYERS GIVE YOU ALL THESE FEATURES

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- Cast Contruction . . . Built to Give Years of Service.

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11111 COMMONWEALTH AVE.,
NORTH CHICAGO, ILLINOIS

Button up your Industrial Coating Problems with Flintkote's HYDRALT*

Here are coatings especially formulated to solve many of your industrial protective coating problems . . . and do it economically . . .

Flintkote Hydralt Asphalt Emulsions.

These versatile coatings, applied by spray, brush and trowel, form efficient barriers against dampness, weather, acid fumes and smoke. Use them on steel, concrete and insulation materials.

Flintkote HYDRALT Protective Coatings, for example, are a unique mineral colloid type of asphalt emulsion which creates a film reinforced within itself. They are durable. So durable, in fact, that many installations remain just as effective after *20 years.*

You'll find *many* advantages in specifying HYDRALT Protective Coatings.

HYDRALT Emulsions require no heating.
. . . Won't crack or check from cold.
. . . Are completely fire-safe and non-toxic.
. . . Won't sag or flow under heat.
. . . Are supplied in various consistencies, for every condition and application method.

Be sure and ask about our Asphalt Emulsions for your own use . . . and button up your industrial protective coating problems *for good.*

* T. M. Reg. U. S. Pat. Off.

THE FLINTKOTE COMPANY, *Industrial Products Division, 30 Rockefeller Plaza, New York 20, N. Y.*

Atlanta • Boston • Chicago Heights • Detroit • Los Angeles
New Orleans • Washington
The Flintkote Company of Canada, Ltd., 30th St., Long Branch, Toronto, Canada

FLINTKOTE
Products for Industry

Just how efficient and economical is your present floor absorbent?

You can easily find out with this portable laboratory

Seeing is believing! See how your present floor absorbent compares with others! Ask an Eagle-Picher representative to show you—right in your plant. See how Eagle-Picher Floor Dry actually gives **more coverage, more absorption per dollar!**

Eagle-Picher Floor Dry is chemically inert, noncombustible, insoluble. Its light weight provides highest coverage. Its light color brightens working areas, adds to plant safety.

EAGLE-PICHER INDUSTRIAL FLOOR DRY No. 85

Since 1843
THE EAGLE-PICHER COMPANY
General Offices: Cincinnati (1), Ohio

The Eagle-Picher Company
Dept. FM-1151, Cincinnati (1), Ohio
Gentlemen: Please send me more information about Eagle-Picher Industrial Floor Dry No. 85.

NAME_____
ADDRESS_____
CITY_____ ZONE____ STATE_____

Here's **Efficient Welding** ..... **On C-F Positioners**

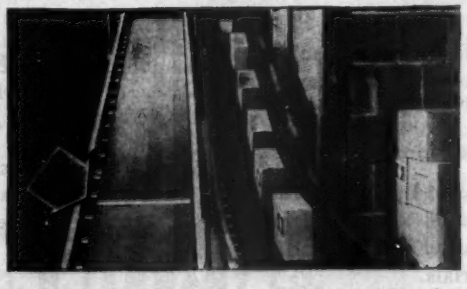
When heavy, unwieldy weldments like these diesel crank cases can be quickly swung into any position so that every weld is made downhand—that's efficient welding!

Welders spend more time welding—do better welding at lower cost when they work with C-F Positioners because these hand and/or power operated machines reduce positioning time to a minimum. Investigate the cost-saving advantages of C-F Positioners. They pay their way in any company.

Write for Bulletin WP24—an illustrated circular detailing the specific advantages of C-F Positioners.

CULLEN-FRIESTEDT CO.
1321 S. KILBOURN AVENUE CHICAGO 23, ILLINOIS

ALLIGATOR
CONVEYOR BELT LACING



in Long Continuous Lengths for Conveyor Belts . . .

★ Excellent for Package Conveyors, Portable Loaders, Trenching and Ditching Machines, etc.
★ In canneries where corrosion or rust is a problem specify Alligator made of Monel.
★ For magnetic separators or anti-sparking specify Alligator made of Everdur.
★ Separable and smooth on both sides.
★ 12 sizes. For belts from 1/16" to 5/8" thick—and *any width.*

Order from Your Supply House. Ask for Bulletin A-60

FLEXIBLE STEEL LACING CO., 4678 Lexington St., Chicago 44, Ill.

JUST A HAMMER TO APPLY IT

Longer bearing life on the "milk run"

Here's evidence of the superior lubrication that a midwest milk processing plant is getting through the use of STANOLITH Grease No. 42. This pump arbor and its anti-friction bearings have been run for a year under conditions of extreme dampness . . . yet there is no appreciable wear, no corrosion.

High maintenance costs and frequent replacement of bearings in both electric motors and pumps had been a direct result of excess humidity in the plant, until a Standard Oil lubrication specialist recommended the use of STANOLITH. After a test run, it was adopted throughout the plant. Now, after a full year of operation, STANOLITH Grease No. 42 has meant a 50 percent reduction in bearing replacements. Corrosion troubles have been eliminated.

STANOLITH's extreme resistance to water has payed off for this user. For your own application, STANOLITH's heat-resistant properties may be most important. Why not discuss the problem with your own Standard Oil lubrication specialist? Just call your local Standard Oil office for his service. Standard Oil Company (Indiana), 910 South Michigan Ave., Chicago 80, Illinois.

STANOLITH
TRADE MARK
Greases

What's your problem?

R. L. Hansen, of Standard's Green Bay office, is the lubrication specialist who recommended STANOLITH Grease No. 42 and helped this processor make important savings.

He and other lubrication specialists are located throughout the Midwest. They are ready to give you prompt and expert attention. If you have a lubrication problem, the lubrication specialist nearest you is the man to see.

He has been specially trained for his job in Standard Oil schools, and in addition, he has plenty of practical experience which qualifies him to give you thorough and reliable service. A phone call to the nearest Standard Oil office is all that's necessary to place him at your service. When he calls, ask him to discuss with you the performance records of the following fine products:

STANOIL Industrial Oils—This general-purpose line of oils provides cleaner operation of hydraulic units and supplies effective lubrication in compressors, gear cases, and circulating systems. One or two grades can replace a wide variety of special oils and lubricants.

CALUMET Viscous Lubricants—On open gears and wire ropes, these greases strongly resist washing and throw-off. Their superior wetting ability affords better coating of gears, better internal lubrication of wire rope.

STANDARD OIL COMPANY

STANDARD (*Indiana*)

SLASH MAINTENANCE PAINTING COSTS...

UP TO 40%

Enterprise
STAIZE-CLENE
THE NEW MIRACLE DIRT REPELLING DISCOVERY

World's Only Paint Made With Patented **SYNCON***

*Made Under U. S. Patent No. 2,353,910

- **Gives walls and ceilings 2 to 3 years of extra service — stays clean from 79% to 90% longer**
- **Lipstick, machine grease, merchurochrome and ink washes off without leaving a single trace of stain**
- **Calibrated colors — Da-Lite and Eye-Rest colors "rated" for light reflective values**
- **Complete line of Flat Enamel, Semi-Gloss Enamel and High-Gloss Enamel finishes — also Enamel Undercoater and Pigmented Primer Sealer**

Compare the advantages STAIZE-CLENE gives you over any other paint. Weigh its dirt resistant qualities —note its better coverage—the fact that it goes farther —consider its high resistance to fumes—this will tell you why STAIZE-CLENE with Syncon has been hailed as the greatest improvement in paint in the last 20 years!

Send for the FREE STAIZE-CLENE Manual—"How You Can Reduce Your Maintenance Painting Cost," and learn how you can make substantial savings with this unbeatable maintenance finish.

MAIL THIS COUPON TODAY!

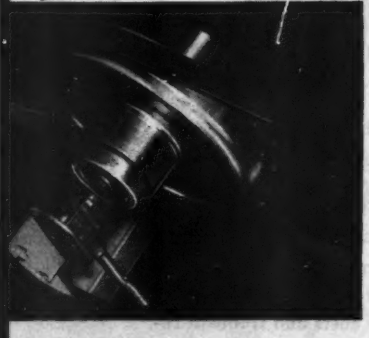
ENTERPRISE PAINT MFG. CO.
Dept. S.C. FM-11
2841 S. Ashland Ave., Chicago 8, Illinois

Please send me the FREE Manual—"How You Can Reduce Your Maintenance Painting Cost."

Name_____
Firm_____
Address_____
City_____ State_____

Can it improve YOUR PRODUCTS? YOUR PRODUCTION?

ANCHOR TORQUE-SENSITIVE MECHANICAL *Control*



COUPLINGS for all direct drives

(Incorporates standard flexible coupling) Operating range 10 to 2,000 inch pounds.

PULLEYS for belt or chain drives
Operating range 20 to 10,000 inch pounds

● These automatic mechanical units make use of increasing torque to control the operation of machinery. They protect machinery from overload and reduce "down time" by eliminating sheared pins. They will also operate signals to give ample warning of build up in load.

Since 1938 many large industries have specified ANCHOR CUT-OUTS. They are the established "protection method" for the conveyor industry.

WRITE FOR CATALOG 50A

ANCHOR STEEL & CONVEYOR CO.
DESIGNERS & MANUFACTURERS
6906 Kingsley Ave., Dearborn, Mich.

NEW! the low-cost* COPYFLEX "20"

With this new, low-cost whiteprinter, the Copyflex "20", you no longer need wait for prints. You get them *when* you want them, *as* you want them—for only 2¢ (average) per. sq. ft.! And that includes *all* costs . . . material, labor, depreciation, etc.

The Model 20 is a completely new, medium volume machine that sells for the lowest price of any machine in its class. It has a full 46″ printing width, takes cut or roll stock, and delivers completely developed, ready-to-use prints. It requires no installation, no special training to operate.

Besides making prints of your engineering drawings, it quickly copies production orders, specifications, accounting reports, and other vitally needed paperwork. See how the Model 20, or one of our other models, can help you. Clip the coupon now and you'll be on the road to faster copying – at substantial savings.

Compare these advantages:

- ***LOWEST PRICED** machine of its class available.
- **NO FUMES.** Bruning Copyflex machines use no vapor developer, therefore cannot possibly emit unpleasant fumes.
- **NO INSTALLATION.** No exhausts needed. Just connect to a 115 volt AC electric power circuit.
- **NO TRAINED OPERATOR NEEDED.** Your secretary, the office boy, or anyone else can operate a Copyflex without special training.

BRUNING

Specialists in copying since 1897

CHARLES BRUNING COMPANY, INC.

Dept. F-111 **100 Reade St.** **New York 13, N. Y.**

☐ Send me full details on the Model 20 Copyflex.

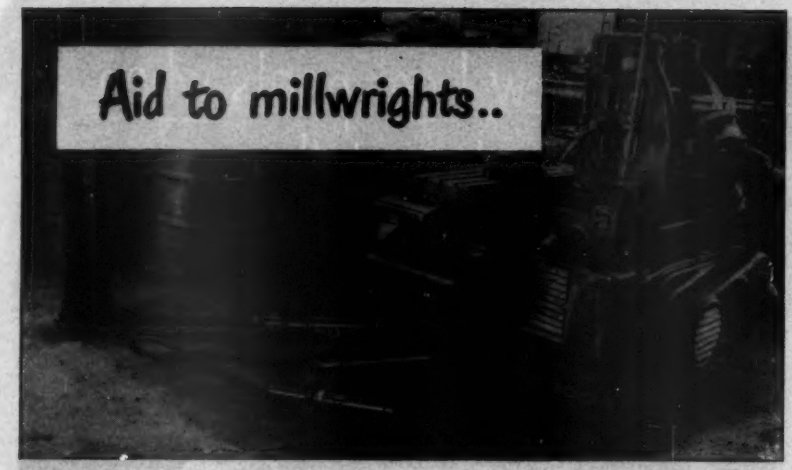
☐ I would like to see a Copyflex machine demonstrated.

Name_____ **Title**_____

Company_____

Street_____

City_____ **Zone**____ **State**_____



Aligning Machinery is one of the many uses for a

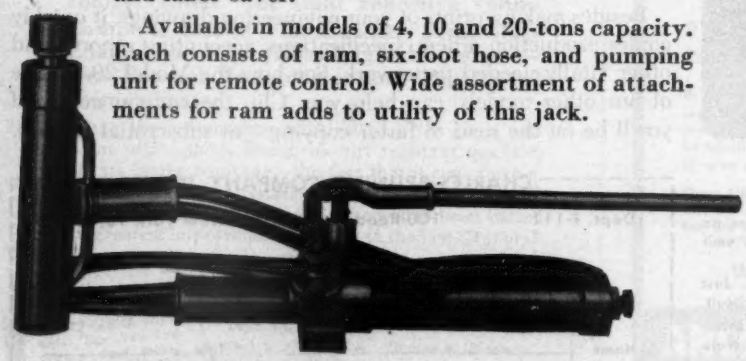
HEIN-WERNER "PUSH and PULL" HYDRAULIC JACK

A man, using a Hein-Werner "Push and Pull" Jack can quickly and easily move and align a big machine for floor placement.

The photograph, reproduced above, shows a heavy milling machine being aligned through the use of a Hein-Werner 20-ton capacity Model H-785, two 8 foot chains and a H-785 chain attachments.

If there's a job of pushing, pulling, bending or spreading to be done, a Hein-Werner "Push and Pull" Hydraulic Jack will prove to be a great time and labor saver.

Available in models of 4, 10 and 20-tons capacity. Each consists of ram, six-foot hose, and pumping unit for remote control. Wide assortment of attachments for ram adds to utility of this jack.



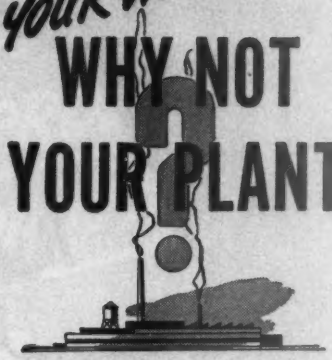
Hein-Werner HYDRAULIC JACKS

The Hein-Werner line of hydraulic jacks is COMPLETE. It includes Under-Axle Jacks of 1½, 3, 5, 8, 12, 20, 30, 50 and 100-tons capacity . . . "Bumper-Lift" Hydraulic Jacks for passenger cars . . . "Swift-Lift" and Service Jacks for shop use.

HEIN-WERNER CORPORATION
WAUKESHA, WISCONSIN

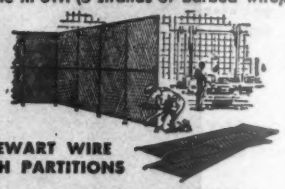
YOU SAFEGUARD YOUR VALUABLES

WHY NOT YOUR PLANT



Unfenced property invites vandalism and sabotage. Don't take chances in these dangerous days. Fence NOW and be safe. Surround your property with a Stewart Non-Climbable Chain Link Wire Fence. Also available for protective measures are Stewart Wire Window Guards, Steel Folding Gates, Wire Mesh Partitions and other products. Catalog No. 85, which contains complete information, will be sent on request.

Stewart 3TH Chain Link Wire Fence. Also available in 5TH (5 strands of barbed wire).



STEWART WIRE MESH PARTITIONS

Sectional with standard panels. May be arranged to fit any space. Ideal for locker rooms, toolrooms, storage rooms.

Other Stewart Products: Iron Picket Fence and Gates; Iron and Wire Window Guards; Sliding and Folding Steel Gates; Iron Railings; Steel Settees; Skylight and Machinery Guards; Bronze Plaques, and many others. When writing for information, please mention products in which you are especially interested.

Stewart maintains sales and erection service in all principal cities.

THE STEWART IRON WORKS CO., INC.
Stanley M. Stewart, President
1856 Stewart Block, Cincinnati 1, Ohio
"Fence Builders to America Since 1886"

Stewart IRON and WIRE FENCES

. . . to make your cleaning a faster, less expensive operation

Your floor cleaning problem is Holcomb's problem. When Holcomb cleaning engineers encounter unusual difficulties, the Holcomb research laboratory lends a hand. Chemists and trained technicians study your cleaning problem thoroughly. Actual samples of the dirt from your floors are analyzed. The composition of the floors is carefully checked. Only after thorough investigation does the laboratory make its recommendations.

Ninety-five cents of every cleaning dollar goes to labor costs. So naturally, your cleaning can be expensive if not done quickly . . . if not done efficiently . . . and if not done with the *correct* products.

Always Holcomb has worked to make cleaning a faster, less expensive operation. For more than fifty years Holcomb has specialized in time-saving chemicals and tools —cleaners, waxes, polishes, detergents, disinfectants, and hundreds of different type brushes—all the equipment necessary for *any* cleaning job.

Holcomb cleaning engineers are trained to solve your cleaning problems. And they are backed by the world's largest cleaning laboratory. It will pay you to standardize with Holcomb—your one source, your dependable source, for scientific cleaning materials.

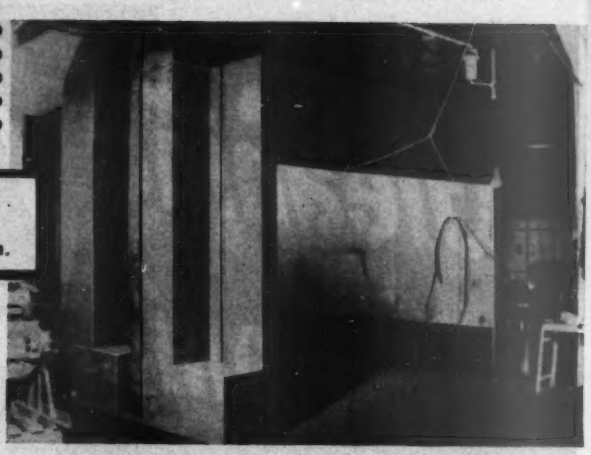
RESEARCH LABORATORY AND FACTORY
1601 Barth Avenue, Indianapolis 7, Indiana
Branches: New York 18, Los Angeles 21

Call a Cleaning Engineer—your nearby Holcomb Serviceman. He will come into your plant, make a complete cleaning survey, give you the best recommendations for walls, floors, ceilings and machinery. Write for name of the Holcomb Serviceman in your community.

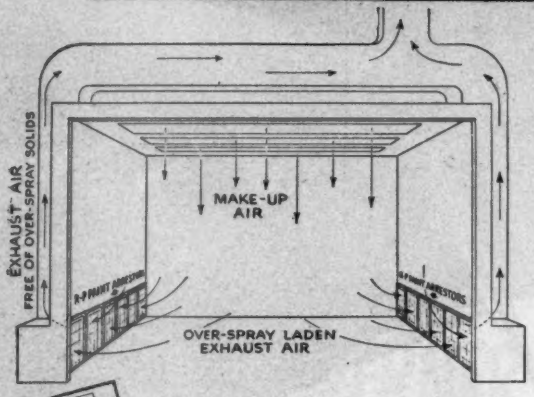
J. I. HOLCOMB
MANUFACTURING COMPANY

Scientific cleaning materials

PROBLEM: How to Build a Down-Draft Booth Without a Pit



SOLUTION:
R-P Paint Arrestor Installation.



This manufacturer required a down-draft booth for painting small items of industrial equipment. The floor construction made a pit installation impractical. The versatility of R-P Paint Arrestors made this modified down-draft booth possible. This manufacturer is now installing the fourth booth of this type. R-P Paint Arrestors can solve your problem. Write for information.

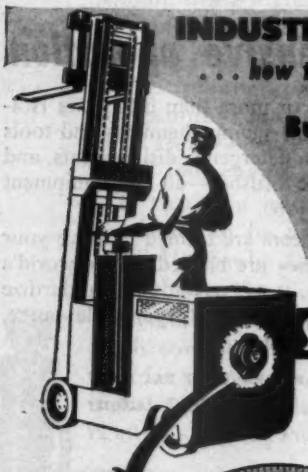
WRITE FOR FREE BOOKLET
Full of informative, helpful suggestions on the many advantages of the R-P system. Write for it today.

RP . . . PRODUCTS OF RESEARCH

RESEARCH PRODUCTS CORPORATION
Dept. F., Madison 10, Wis.

INDUSTRIAL TRUCKS
. . . how to tell when they are

Busy?
Idle?
Lifting?
Engine Running?



PUT ON
Servis Recorders

A couple of screws or bolts does the job. Then the truck *itself writes its own story!*

THE CHART
Wax covered, no ink or pencil needed; a sapphire stylus marks the record—a picture of the day's work at a glance.

SERVIS RECORDER—closed. Just bolted on—no connection with any moving part.

Write for Bulletin IT

THE SERVICE RECORDER COMPANY
1375 Euclid Avenue • Cleveland 15, Ohio

DETECTO SCALES

There's a precision-accurate Detecto Scale for your specific weighing and counting need. The Detecto helps increase production, yet assures you maximum accuracy by making slightest weight discrepancies immediately visible.

DETECTO-GRAM RATIO COUNTING SCALE
Another Detecto-Gram Scale to speed counting operations. Model #1743 has a special counting tray attached to the beam for use when counting in odd amounts.

Write for Literature

DETECTO SCALES • INC.
MAKERS OF FINE SCALES SINCE 1900
540NF PARK AVE. • BROOKLYN 5, N.Y.
SCALE ENGINEERS IN ALL PRINCIPAL CITIES

CAN *YOU* USE THE "UTILISCOPE"?

The advertisement at the right appeared in Business Week. It has been suggested that this ad contains considerable food for thought for the readers of FACTORY also. The particular application illustrated here may not interest you but it probably will suggest other uses for the "Utiliscope" in your operations.

If you want to look into the possibilities of the "Utiliscope", simply write us for a copy of Bulletin 1025G which explains the equipment and shows various applications. Please address your request to Department "G".

DIAMOND POWER SPECIALTY CORP.
Department "G"
LANCASTER, OHIO

NOW You Can *See* Where You Can't *Look*

DIAMOND "UTILISCOPE"

(WIRED TELEVISION)

Saves Manpower

Here is another operation where the Diamond "Utiliscope" (wired television) saves manpower . . . enables one man to do the work formerly done by two.

The "Utiliscope" extends the power of the eye so you can SEE where you can't LOOK. Obstacles that prevent direct observation (such as danger, building members, discomfort, distance, etc.) are easily overcome by the "Utiliscope."

The "Utiliscope" is surprisingly simple and low in cost. No special skill is needed for installation and operation. Stability and reliability are exceptional . . . the "Utiliscope" is readily adaptable to outdoor mounting.

Let us tell you about numerous operations where the "Utiliscope" is preventing accidents, saving labor, improving product quality and increasing production . . . ask for Bulletin 1025.

DIAMOND POWER SPECIALTY CORP.
FIRST IN INDUSTRIAL TELEVISION
LANCASTER, OHIO • *OFFICES IN 39 PRINCIPAL CITIES*
Diamond Specialty Limited — Windsor, Ontario
Since 1903, Diamond has Manufactured Quality Equipment For Industry

WRITE FOR BULLETIN 1025 G

YOUNG OIL COOLERS *Save Waste Heat!*

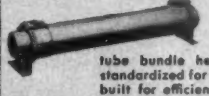
Young "OSH" Unit Oil Cooler

Here is the economical way to cool lube oil when water is at a premium or when waste heat can be used to warm room interiors. Young Unit Oil Coolers do double-duty . . . serve as heat exchangers and unit heaters.

Typical Young-quality design and construction include: a non-ferrous tube-and-fin core, one-piece cast iron headers, spring suspension of cooling core for free expansion and contraction, sturdy welded mounting brackets, etc.

These Young units cost no more than shell and tube bundle heat exchangers—can pay for themselves quickly in waste heat recovery.

SHELL AND TUBE BUNDLE LINE IS COMPACT, EFFICIENT



For your normal oil cooling requirements, you'll find Young shell and tube bundle heat exchangers are standardized for economy, precision-built for efficiency.

YOUNG

Heat Transfer Products for Automotive and Industrial Applications.

Young Quality

Heating, Cooling, and Air Conditioning Products for Home and Industry.

T. M. REG. U. S. PAT. OFF.

YOUNG RADIATOR COMPANY

Dept. 801-L, RACINE, WISCONSIN

Plants at Racine, Wisconsin and Mattoon, Illinois

YOUNG RADIATOR COMPANY
Dept. 801-L, Racine, Wis.

☐ Send me your catalog No. 3550 on Unit Oil Coolers.

☐ Include Catalogs No. 1049 and 1149 on Shell and Tube Bundle Heat Exchangers.

Name_____

Company_____

Address_____

City_____ Zone____ State____

Railmaster 3-ton crane serves the paint shop area and interlocks via track curve with crane serving the sand blast room. Interlocking track is equipped with opener to allow fire door closure.

Track and switches with spur tracks over welding booths for easy spotting of heavy loads in booths.

Compact track and crane system over the electrical shop area. Note hand chain drop section on extreme left, which lowers a hoist carrier for service or repair.

MONORAIL REDUCES *Maintenance Costs*

In this, one of the country's largest maintenance shops, American MonoRail Overhead Handling Equipment serves the entire department. Included in the department are: machine shop, electrical repair, metalizing room, welding, painting and sand blast room, pipe shop, and inside and outside storage. This plant has shown a definite increase in efficiency and a great reduction in handling costs.

Let an American MonoRail engineer show you how you can cut handling costs and save valuable floor space.

WRITE FOR C-1 BULLETIN

THE AMERICAN MONORAIL COMPANY

13114 ATHENS AVENUE • CLEVELAND 7, OHIO

IT MUST BE *Continuous* TO BE PROFITABLE!

—MATERIALS HANDLING

A conveyor belt takes the lost motion out of materials transfer . . . a De Laval Centrifugal Separator takes the lost time out of the separation phase of a chemical process by making it continuous. Often De Laval machines will do in seconds by means of centrifugal force work that once took hours by settling or filtration.

An important part of De Laval's service to the Process Industries is the ability to provide exactly the right machine for the purpose. Almost every industrial mixture presents its own specifications—specific gravity . . . viscosity . . . the quality and quantity of solids present. Whether the machine need separate only a few gallons per hour of a liquid mixture, or if a "Nozzle-Matic" unit capable of handling 6,000 gallons per hour is required, De Laval engineers have the right machine for the job.

Why De Laval?

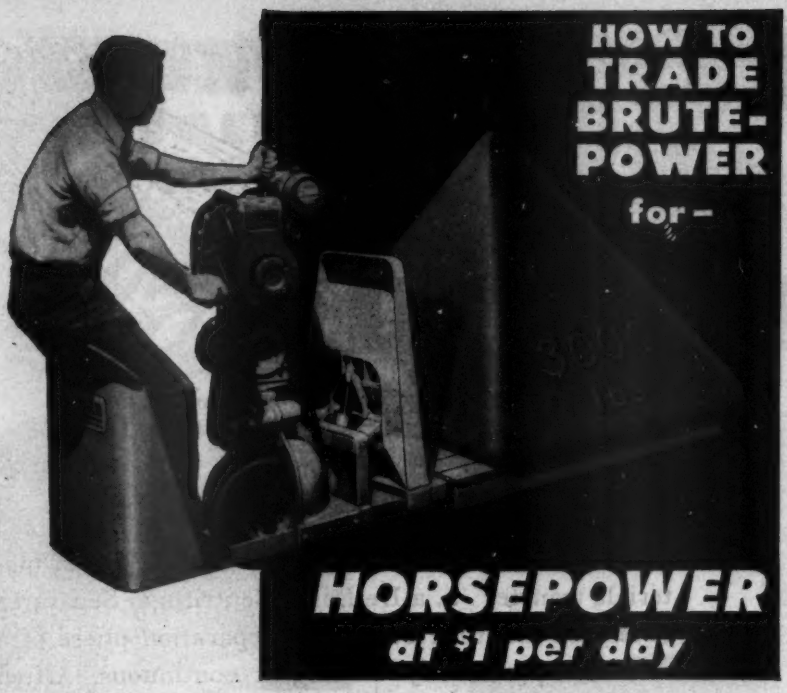
De Laval has over 70 years experience in solving problems of separation and clarification. Your problem may be quite similar to one that has already been solved by De Laval centrifugals. It will pay you to ask.

THE DE LAVAL SEPARATOR COMPANY
Poughkeepsie, N. Y. 427 Randolph St., Chicago 6
DE LAVAL PACIFIC CO., 61 Beale St., San Francisco 5
THE DE LAVAL COMPANY, Limited, Peterborough, Ont.

De Laval

CONTINUOUS CENTRIFUGAL SEPARATORS & CLARIFIERS

FOR FASTER PROCESSING SYSTEMS



HOW TO TRADE BRUTE-POWER for— HORSEPOWER at $1 per day

Here's how you can install modern lift-truck handling methods in your plant—and your fuel cost may be less than $1 per 2-shift day. The versatile Truck-Man's rugged gasoline power, hydraulic lift and maneuverability fit it into plants and warehouses of all types and sizes. Here's how Truck-Man can save your money and manpower:

IF YOU'RE SMALL — Truck-Man Skid Lift, Pallet Toter or Platform Utility move loads now handled by two or three men with "push-pull" trucks or hand-led powered "jacks," limited to the pace of the operator.

IF YOU'RE GROWING — The Truck-Man Pallet Toter is economical for picking up distant palletized loads and laying 'em down for your heavier, costlier "stacker." Use Model D if you work with skids.

IF YOU'RE BIG — Plants covering acres use fleets of Truck-Man Pallet Toters as inter-plant "feeders" — increase the efficiency of their big fuel-and-power-consuming stackers by restricting travel to small areas. The Skid Lift easily handles 3500 lb. skid and bin loads, loading directly on trucks and cars.

Model DT Platform Utility—2000 lb. Capacity

Model D Skid Lift—3500 lb. Capacity

TRUCK-MAN GIVES YOU—

• Low cost, easy maintenance, a minimum of fuel and labor • Maneuverability in crowded aisles, 360° steering, 27" width • Simple, sure handling with driver always facing load and his "spot" • Pneumatic-tired drive wheels for fragile loads, wooden floors, reduced driver fatigue • Dash pot throttle controls for soft starting; two speeds forward and reverse; speeds from a creep to 8 mph • Efficient load to weight ratio of almost 4 to 1, easy on elevators, ramps, car and truck floors • Rugged design — built for 'round-the-clock, man-saving work!

NEW POWER
NEW STEERING
NEW TRANSMISSION

Send Coupon for Catalog

truck-man **Div. of The KNICKERBOCKER CO.**
581 LIBERTY ST. • JACKSON, MICH.

NAME_____ TITLE_____

ADDRESS_____

CITY_____ ZONE____ STATE_____

MERCOID

SOLVES INDUSTRY'S AUTOMATIC CONTROL PROBLEMS

THE ONLY 100% MERCURY SWITCH EQUIPPED CONTROLS

The distinguishing feature of Mercoid Controls is the exclusive use of Mercoid hermetically sealed mercury switches. These switches are not subject to dust, dirt or corrosion, thereby assuring better performance and longer control life.

Pressure · Thermostats Line Voltage · Temperature
Explosion Proof · Thermostats Low Voltage · Liquid Level
Float Operated · Oil Burner Safety · Transformer-Relay

If you have a control problem involving the automatic control of pressure, temperature, liquid level, mechanical operations, etc., it will pay you to consult Mercoid's engineering staff—always at your service.

Complete Mercoid Catalog sent upon request.

THE MERCOID CORPORATION, 4201 BELMONT AVE., CHICAGO 41, ILL.

CUSTOM-BUILT — NOT CUSTOM PRICED

Single and Polyphase

Fully enclosed Ball Bearings; semi-enclosed construction that protects against dripping and splashing hazards and assures cool, continuous operation. Available in polyphase—from ½ to 60 hp, single phase—from ½ to 5 hp, for wide adaptability of use and greater flexibility in your power planning.

Write for Complete Details Today

VALLEY
ELECTRIC CORPORATION
3121 FOREST PARK BLVD. • ST. LOUIS 3, MO.

Kimpak Float Packaging*

AERO MAYFLOWER TRANSIT CO.

Cuts shipping costs— reduces damage in transit!

How many millions of dollars manufacturing concerns lose each year because of product damage in shipment could never be accurately estimated. But today, any company is able to count its *savings* after a change from outmoded, inferior packaging materials. In countless cases the change has been to KIMPAK* Float Packaging—now recognized as one of the world's most effective packaging methods at lowest true cost.

The effectiveness of KIMPAK protective cushioning is well demonstrated by the Aero Mayflower Transit Company—coast-to-coast movers who have compiled a unique record of damage-free shipments since their adoption of a modern, up-to-date packaging operation. Because Aero Mayflower transports the wide variety of furniture items which are found in the home, their use of KIMPAK indicates the versatility of this superior cushioning material. KIMPAK is soft, clean, feather-light—as easy to apply as wrapping paper. Available in rolls, sheets or pads, it can be "tailored" to almost any size, shape or density. KIMPAK protects against shock, scratching and press-marking—will absorb up to 16 times its own weight in moisture. No wonder Aero Mayflower can point with pride to such a fine shipping record. And no wonder so many manufacturers are finding a satisfactory answer to their packaging problem—with KIMPAK protective cushioning.

Take a tip from a company that has packed and shipped *your* kind of product under the most difficult conditions—with complete safety. Investigate KIMPAK Float Packaging at your earliest opportunity. For complete information, write to Kimberly-Clark Corp., Neenah, Wis.

Kimpak

REG. U.S. PAT. OFF. & FOREIGN COUNTRIES

A Kimberly-Clark Cellulose Wadding Product

PROTECTIVE CUSHIONING

*T. M. REG. U. S. PAT. OFF.

Metal Statue is well padded with KIMPAK protective cushioning.

Glass Picture Frame in wood crate with edges cushioned by KIMPAK.

Mahogany Table. Top cushioned with KIMPAK to protect filigree.

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Whatever you make or handle in your business Standard Conveyor, with an experience record of more than 45 years, has the "know-how" to assist you to use conveying equipment to best advantage. Write —

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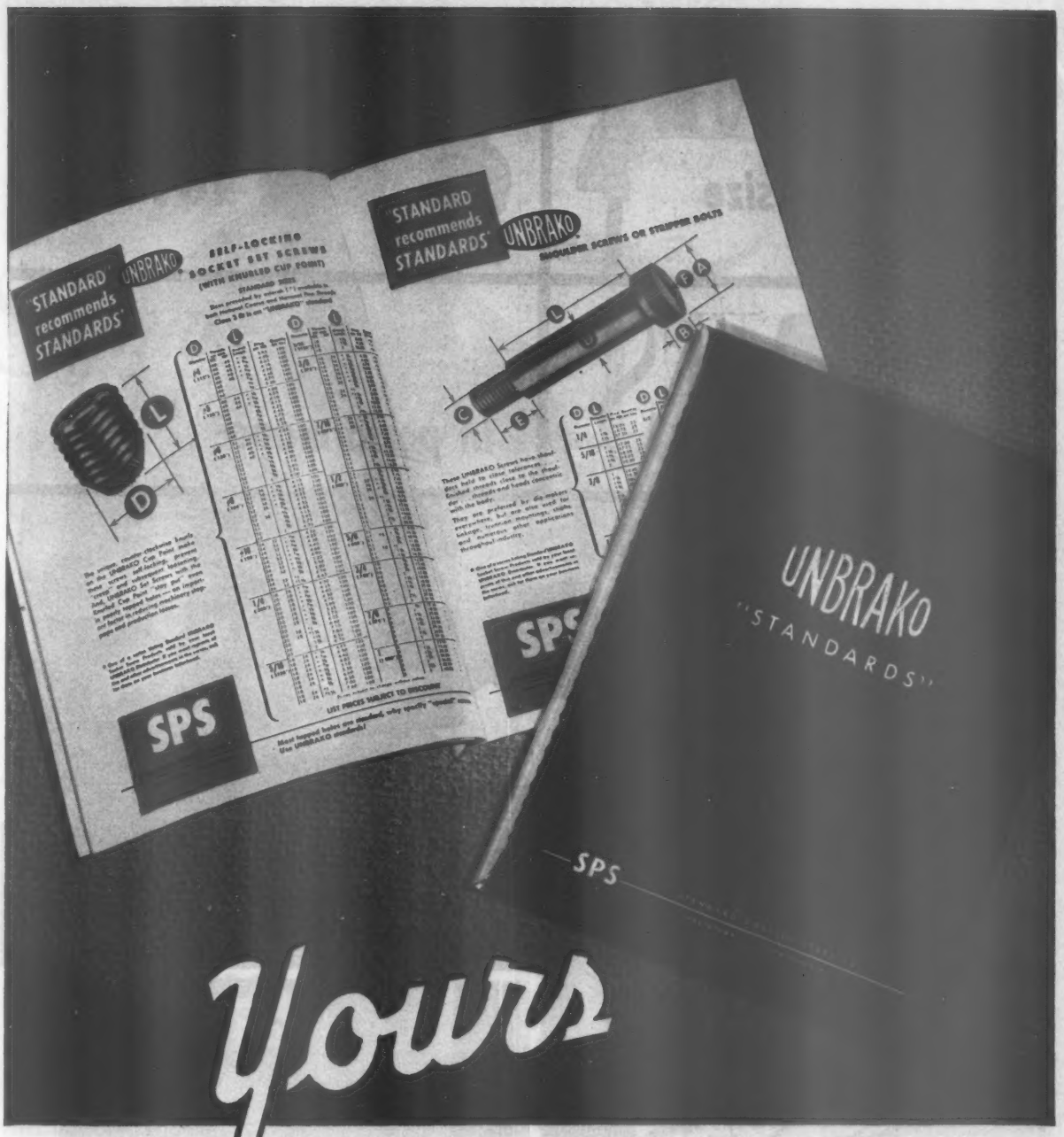

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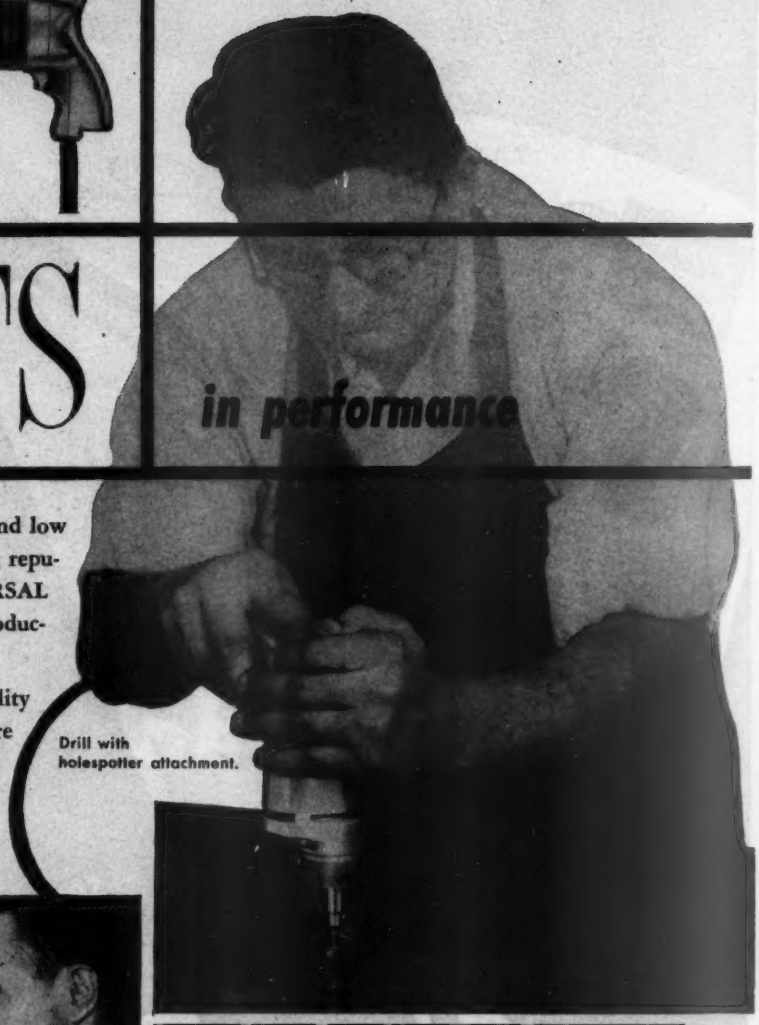
There is no premium for the superior quality of these universal electric drills, which are sold direct to the user by Chicago Pneumatic, the only major company selling electric tools directly to industry.



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CP Midget is unsurpassed for fast work on production lines.

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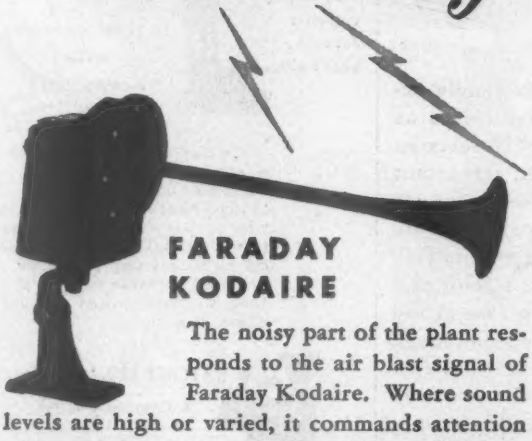

FARADAY KODAIRE

The noisy part of the plant responds to the air blast signal of Faraday Kodaire. Where sound levels are high or varied, it commands attention with a high powered trumpet blast—perfect for mills, foundries, industrial plants, either inside or outside. Try it on your next new or replacement job.

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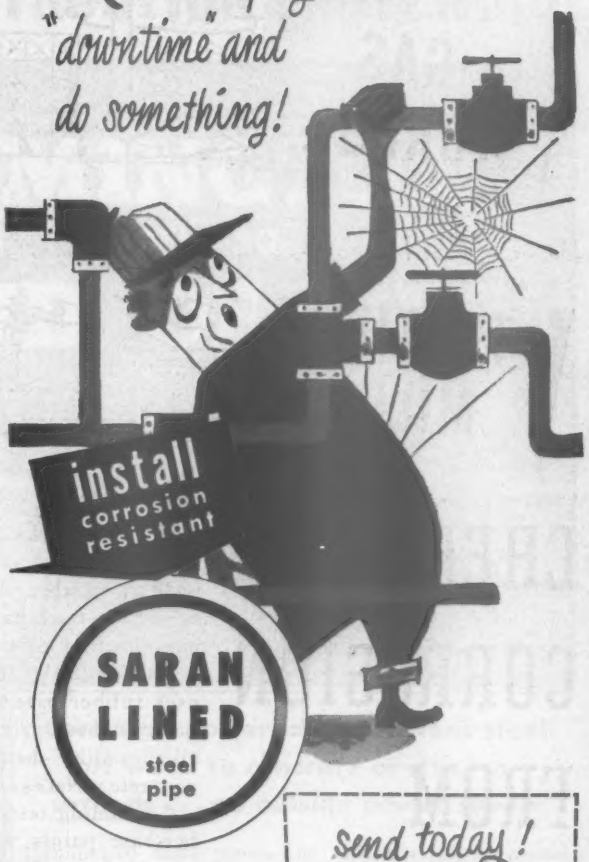
Where noise levels may not be quite so varied or loud, the Faraday Buzzer is a perfect signal. It provides a sharp buzzer tone at high frequency which can be easily increased or decreased by a simple screw adjustment. Fits Uni-Pact adapter plate and can be incorporated into the famous Faraday Unipact system. Write for Sperti Faraday Signal Catalog.

Sperti Faraday Inc.

ADRIAN, MICHIGAN

BELLS • BUZZERS • HORNS • CHIMES • ULTRA-VIOLET SANITIZERS • VISUAL AND AUDIBLE PAGING DEVICES AND SYSTEMS

Quit worrying about "downtime" and do something!



Many reasons for "downtime" are unpredictable—BUT lost production due to pipe repairs and replacements is very definitely in the realm of your control! Follow the lead of many of the country's leading manufacturers, install dependable saran lined steel pipe—that means long term operation at a minimum maintenance cost.

Consider these advantages: Saran lined steel pipe provides excellent corrosion resistance, high pressure strength, superior rigidity, and its ease of installation requires NO special tools or handling.

These advantages are important to you—now more than ever before, so investigate saran lined steel pipe today. Mail this coupon to the Saran Lined Pipe Company for full information. *Saran lined steel pipe is manufactured by The Dow Chemical Company.*

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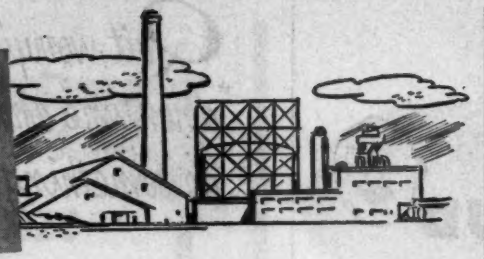
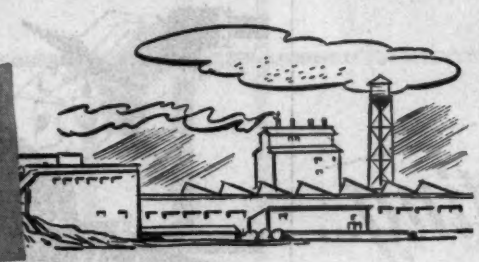


GAS WORKS...



TEXTILE MILLS...

CHECK CORROSION FROM ACIDS AND ALKALIES LONGER WITH

Gas works . . . constantly exposed to corrosive fumes as well as weather, find the protection of rubber-base paints an important contribution to lower maintenance costs. Similarly, the textile industry uses rubber-base paints extensively because these paints resist acids and alkalies alike—help protect metal and concrete surfaces as well as equipment.

Continuing tests indicate that rubber-base paints will resist common causes of corrosion three to four times longer than ordinary protective coatings. Exceptionally satisfactory service results are obtained in numerous industries where surfaces are attacked by acids, alkalies, and salts.

Rubber-base paints dry fast and are easy to apply. They are especially durable on concrete because they resist abrasion and the free alkali in cements. Ask your paint supplier for details or write:

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905 Market Street, Wilmington, Delaware

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CR51-3

SAVE—with Safety use a SIMPLEX on every Jacking Job

● Save time and money on every job with this easy-to-use, Simplex Emergency Jack that is engineered for safety. Jack tilts on base for angular operation. Lifts full capacity on cap; on auxiliary cap shoe; on the machine serrated toe, or at any intermediate point by using chain as sling!

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A Complete Line for Every Jacking Job

Safe! Fast! Powerful!

1½ to 35 Tons Capacity

For all general duty lifting, lowering, moving, leveling, skidding.

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88% Easier Lifting!

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For shops, factories, construction, transportation and mine jacking.

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REVOLUTIONIZES CONSTRUCTION FASTENING!

LOOK AT THESE EXCEPTIONAL FEATURES

COMPACT AND PORTABLE — Weighs only 5½ pounds, ideal for scaffold, ladder, overhead work, inaccessible places. Comfortable to use in any position.

SPEED—One man can set up to 5 studs per minute, as much as 100 times faster than other methods. Sets stud at whatever depth is required up to 2¾ inches, depending on material.

ELIMINATES INVESTMENT IN OUTSIDE POWER —Self-powered. Especially useful in isolated places.

TRIPLE SAFE—Plainly visible red dot indicator shows when it's cocked; safety must be depressed before and during squeezing of main trigger; permanently attached safety shield must be compressed against work before Stud Driver will operate. Trigger can't be accidentally tripped. Slight recoil. Low noise level.

WIDE VARIETY OF STUDS are available for every fastening job. Genuine Remington studs are trademarked for user's protection. Pull-out resistance as high as two tons in good concrete, depending on stud used. Cartridges are available in 5 power loads covering practically all fastening needs.

UNIQUE, FAST ASSEMBLY OF STUD AND CARTRIDGE—Tough plastic heel cap permits lightning assembly of any cartridge with any Remington stud, identifies power load, protects head and thread of driven stud.

PRICE for Model 450 Remington Stud Driver complete in rugged steel carrying case—only $119.50.

Speeds all these jobs . . . and many more

1. Hanging steel sash and door bucks to concrete and brick.
2. Anchoring wood plates to concrete floors and ceilings for setting partitions.
3. Fastening wood furring strips to concrete for attachment of metal lath.
4. Anchoring suspended ceilings, sprinkler systems and lighting fixtures to concrete.
5. Attaching conduit and panel boxes to steel and masonry.
6. Anchoring light machinery to concrete pads.
7. Erection of signs, awnings and venetian blinds on steel or masonry.
8. Hanging radiator housings to concrete or brick.

Cartridge-powered tool fastens steel or wood to concrete or steel in seconds . . . no outside power source

Exhaustive tests prove the new cartridge-powered Remington Stud Driver to be the finest, speediest fastening system ever devised . . . easily sets as high as 5 studs per minute. No other equipment needed. Speeds work and cuts costs. The Model 450 Remington Stud Driver is made by Remington Arms Company, Inc., America's oldest and foremost sporting arms manufacturer. For detailed information and the name of your nearest distributor, fill out and mail the coupon below. There may be slight initial delays in delivery until production and distribution catch up with demand.

"If It's Remington—It's Right!"

Remington DU PONT

MAIL THIS COUPON TODAY FOR FURTHER INFORMATION

Remington Arms Company, Inc.
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I am interested in obtaining detailed information on the Model 450 Remington Stud Driver

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An ad in the classified section of FACTORY will place your needs before expert technicians. Act now to catch the next issue closing on the 10th of November.

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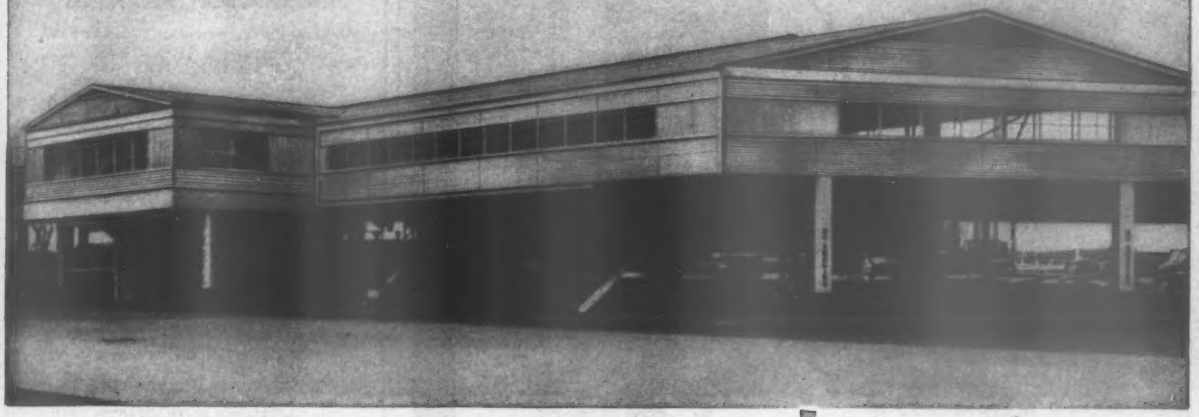
LOWER COST LOAD ON LOADING RACK



This Esso Loading Rack in Washington, D. C., illustrates the rapid trend to aluminum for gasoline distributing centers. This roofing and siding combines strength with light weight; cuts framing costs; reduces total weight of the superstructure. Corrosion resistance and freedom from rust mean long life with minimum maintenance—no painting. And aluminum's radiant heat reflectivity takes the sun load off the big roof area, keeps workers comfortable in summer.

In this Esso design, the lower part of the projecting office quarters is sided with Reynolds *Lifetime* Aluminum Weatherboard—for decorative contrast. All the rest of the walls and the roof are Industrial Corrugated. For literature, technical assistance and application details, call on Reynolds.

Offices in principal cities. Check your classified phone book for our listing under "Building Materials," or write: Reynolds Metals Company, Building Products Division, 2005 South Ninth Street, Louisville 1, Ky.

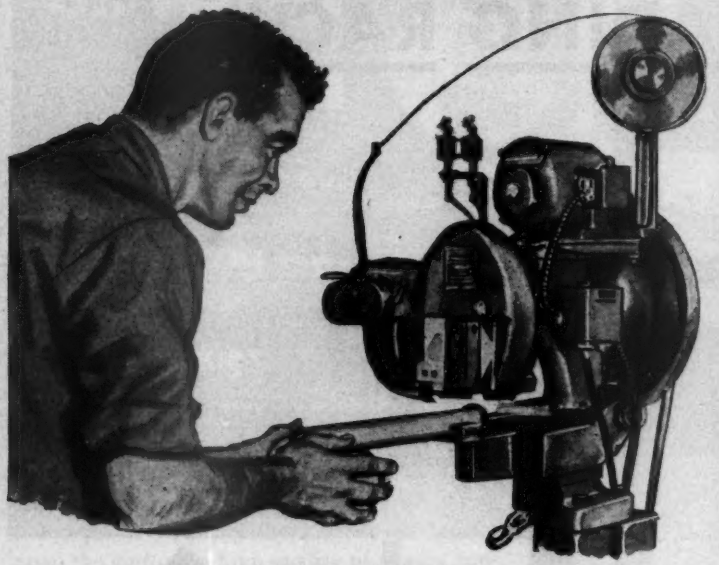
Aluminum is required for planes and other military needs. Reynolds *Lifetime* Aluminum Industrial Corrugated is still produced, but the total supply is necessarily reduced. Rated orders receive priority handling.

Specifications for Reynolds *Lifetime* Aluminum Industrial Corrugated:

Thickness .032"
Corrugations 7/8" deep, 2-2/3" crown to crown
Uniform load support (roof) 80 p.s.f. on 4' purlin spacing
Uniform wind load capacity (siding) 20 p.s.f. on girt spacings up to 7'9"
Roofing width 35", coverage 32"
Siding width 33-3/4", coverage 32"
Lengths 5', 6', 7', 8', 9', 10', 11', 12'

REYNOLDS *Lifetime* ALUMINUM
INDUSTRIAL CORRUGATED

How to cut assembly costs by stitching metal and other materials together



"Waste neither time nor money, but make the best use of both."

—Ben Franklin, 1748

Assembly time and assembly costs are important to your over-all profit picture. The fastening method you use may well be the difference between black ink or red.

In many cases today you can assemble products far faster, better, and at lower cost with an Acme-Morrison Metal Stitcher than you can with expensive rivets, screws, nails, bolts or spot welds.

You can stitch steel to brass or copper or aluminum, or stitch such metals in many combinations to materials such as wood, felt, cork, canvas, leather, rubber, fibre, plastic or asbestos.

Many manufacturers have saved materials and labor costs, and improved their finished products at the same time, by turning to Metal Stitching.

To find out if you can, too, send in the coupon below for your free copy of our new 12-page booklet!

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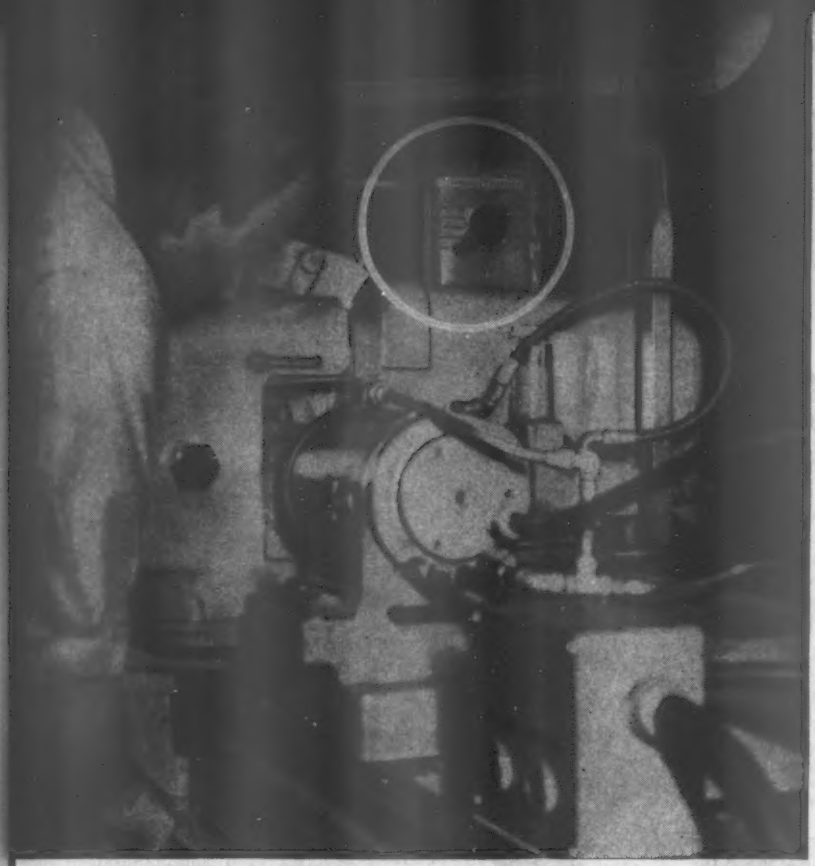

IN SAFETY SWITCHES—Marlin-Rockwell Corporation's ball bearing factories use 30 ampere HCI switches as disconnects for high frequency motors used to power internal grinders. HCI interior is removable for easy wiring and inspection. No exposed live parts when switch is OFF and door open. Underwriters' Laboratories Approved.

IN COMBINATION STARTERS—Rugged, simple construction of HCI is perfectly adapted to use as disconnect in combination starters.

SAFE LOAD BREAKING

with Unique "Arc-Quench" Action

For the first time in a safety switch, magnetic repulsion is used to break load quickly, safely.

In Trumbull's HCI (High Capacity Interrupter) Type A switch, double-break contacts are projected and withdrawn with piston-like speed and force. The arcs repel each other and strike against grid pins, breaking into smaller arcs which cool rapidly.

The unique arc-quenching action provides safety, lengthens contact life by preventing pitting, and gives the switch much greater life expectancy. HCI withstands heavy short circuits without damage.

Its initial success as a safety switch has led to its adoption for use as disconnect in combination starters, control centers and switchboards.

Write for Bulletin TEC-10 which describes the HCI fully.

IN SWITCHBOARDS AND CONTROL CENTERS—Compact 30 and 60 ampere HCI switch interiors can be mounted in twin switchboard units (100 ampere HCI takes same vertical space), saving trough space and providing dependable short-circuit protection and sure ON-OFF handle indication.

TRUMBULL (T) ELECTRIC

DEPARTMENT OF GENERAL ELECTRIC COMPANY

PLAINVILLE, CONN.

FOR THOSE HARD-TO-GLUE JOBS..

Paisley SCIENTIFIC ADHESIVE SERVICE

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FREE CONSULTING SERVICE: Buy your Adhesives the scientific way. *Send for an Adhesive Operation Data Sheet. Fill in and return it to our laboratory for analysis and recommendations. Write today. There's NO obligation.*

TEAR OUT.. PASTE ON LETTERHEAD AND MAIL TO US TODAY!

Paisley Products, Inc.
1770 Canalport Ave., Chicago 16

Gentlemen: We are interested in Paisley SCIENTIFIC Adhesives. Please send us, at once, without cost or obligation, the Laboratory Reports and Data Sheet indicated below:

LABELING ADHESIVES

- ☐ Shipping Room Glue (For Waybills, PP Labels, Case Sealing)
- ☐ Grip-Tight Label Paste (Tin Cans, Drums, Etc.—Hand Brushing)
- ☐ Resinent Label Cement (Paper to Metal — Table Gummer Type)
- ☐ Coolerproof Bottle Label Glue (For All Automatic Machines)
- ☐ #1908 Bottle Label Glue (Fast Setting—Table Model & Automatic Machines)
- ☐ Can Labeling Adhesives (Burt, Standard Knapp, Kyler, New Way, etc.)

PACKAGING ADHESIVES

- ☐ Boxcel Shipping Case Glue (Corrugated Cases—Hand or Machine)
- ☐ Cartonite Glue (Small Carton—Machine Sealing)
- ☐ Water Resistant Sealing Glues (JAN-P-101 & JAN-P-140 Export Specs.)
- ☐ #4199 Resin Glue (Paimar, Brightwood—Wax Stocks)
- ☐ Waxed Glassine Paper Glues
- ☐ #3740 M.P. Cellophane Glue
- ☐ #3440 Cellulose Acetate Glue

COMBINING & LAMINATING ADHESIVES

- ☐ #1707 Combining Cement (Porous to Non-Porous Surfaces)
- ☐ Plastics Fabricating Cement (Submit samples of parts for Lab Check)
- ☐ Foil to Paper Cements (Describe application & End Use)
- ☐ Foil to Metal Cement (To Steel, Aluminum, Painted Metals, Etc.)
- ☐ Rubber to Metal Cement (Describe Operation)
- ☐ #2148 Resin Wood-Glue (Sets Within 20 Seconds)
- ☐ Lignetite Cassia Wood Glue
- ☐ ADHESIVE OPERATION DATA SHEET (You fill in and return for laboratory recommendation.)

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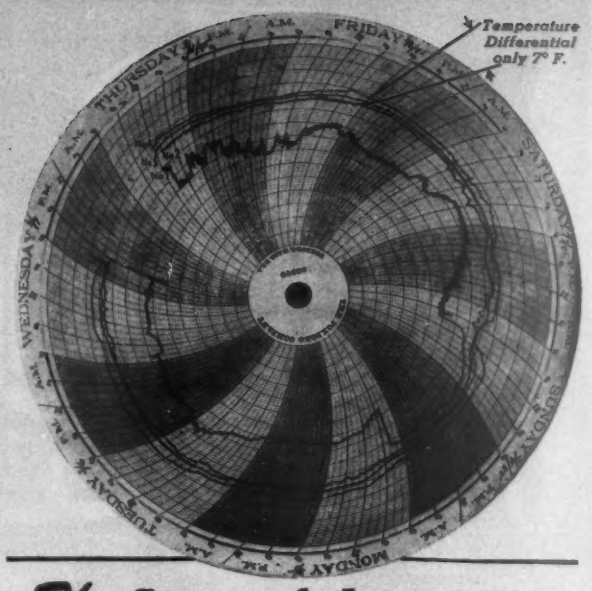
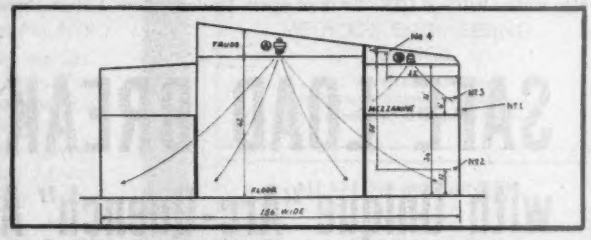


The Story of the TEMPERATURE CHART

Replacing an expensive but inadequate heating system, Wing Revolving Unit Heaters completely solved a difficult heating problem in a shipbuilding plant. The building is 156' wide by 62' to the cross beams by 802' long. A mezzanine is 42' by 21' to the cross beams by 802' long.



Ten Wing Revolving Unit Heaters with one-way discharges cover the section marked "A" on the diagram. Ten smaller Wing Revolving Heaters cover the mezzanine section marked "B". Fairly high working temperatures (75° F) were required. The chart from a recording thermometer with bulbs located as shown, reveals graphically the working temperatures, the relatively low ceiling temperatures and the fluctuating outdoor temperatures (32° to 75° F) over one week's time.

Write for further details and a copy of Bulletin HR-6.

L. J. Wing Mfg. Co., 162 Vreeland Mills Rd., Linden, N. J.
Factories: Linden, N. J., Montreal, Can.
In Europe . Etab. WANSON, Brussels, Belgium

Wing REVOLVING UNIT HEATERS

J. I. CASE CO. Makes Savings *You* Can Match on Your Material Handling Jobs

ANOTHER INDUSTRY PROFITS WITH LORAIN

These *extra advantages* are yours when Lorain Crane power takes over your material handling jobs . . .

16 LIFTING ATTACHMENTS may be installed on the crane cables, to enable Lorains to handle practically any kind of material, in any size or shape — from sand to steel to scrap.

3 MOUNTING TYPES to adapt Lorains to all kinds of yard layouts, ground and travel conditions. Lorains are available on crawler, single engine rubber-tire and 2-engine Moto-Crane mountings, with a wide variety of sizes in each type.

EXTRA USES . . . EXTRA SAVINGS because of Lorain interchangeability and job versatility. Can serve on plant construction, erection and maintenance. Rubber-tire cranes develop the power and tractive effort to push and pull loaded railroad cars. *You can always keep a Lorain busy!*

Ask your Thew-Lorain Distributor for copy of bulletin, "LORAINS IN INDUSTRY" or write to . . .

THE THEW SHOVEL CO.
Lorain, Ohio

1 Faster Material Flow . . .

The picture below at the J. I. Case Co., Burlington, Iowa, plant tells its own story of efficient material handling. From railroad cars to storage platform — or from assembly line to outgoing cars — their Lorain "TL" Crane moves in *whenever* and *wherever* needed to handle all types of material with speed and economy.

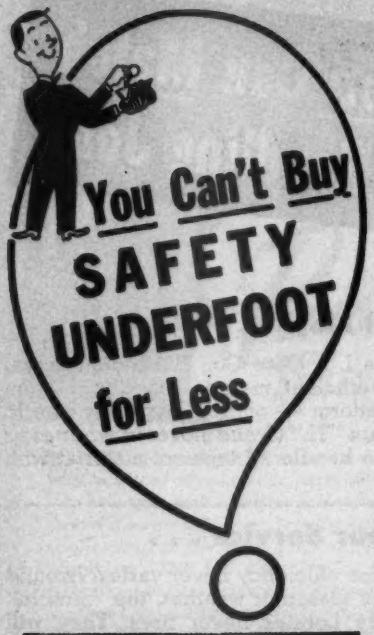
2 24-Hour Service . . .

Lorain Crane efficiency never varies. Around the clock, in any season or weather, the "muscle" of these sturdy Lorains never tires. They will hurry to any location on a moments call to keep moving on every shift.

3 Manpower Savings . . .

One man at the controls of a Lorain Crane does the work of a crew of strong armed men. He has the power at his fingertips to lift heavy loads—faster, safer and at lower cost. Manpower savings will pay for Lorain Crane power.

THEW LORAIN CRANES FOR INDUSTRY



DO-ALL

RUBBER & CORD MATTING

also serves as the ideal comfort mat.

Used in entrances, corridors and lobbies, it affords an effective remover of dirt from the soles of shoes.

Hugs the floor. Beveled edges. Comes in rolls 20'5" long, comprised of 35" x 35" units of four 17-inch square sections. Easily cut to cover desired area.

Four mottled colors: Venetian Red, Erin Green, Delft Blue and Mosaic.

Send coupon today for literature and prices.

AMERICAN MAT CORPORATION
1745 Adams Street Toledo 2, Ohio

Please send literature and prices on Do-All Matting.

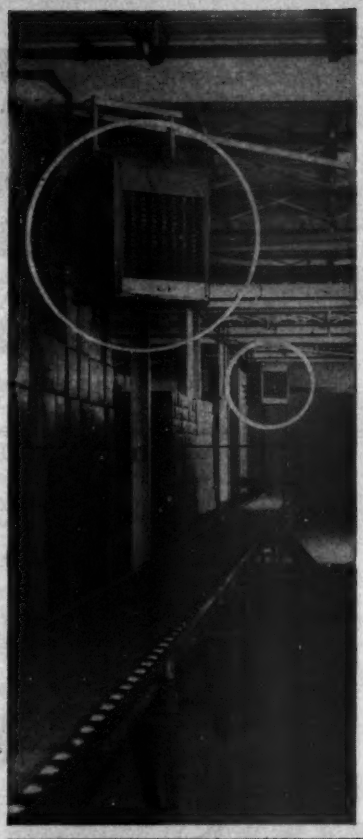
Name _____

Firm _____

Street _____

City & State _____

IN CANADA: American Mat Corp. Ltd.
Canada Trust Building
Windsor, Ontario

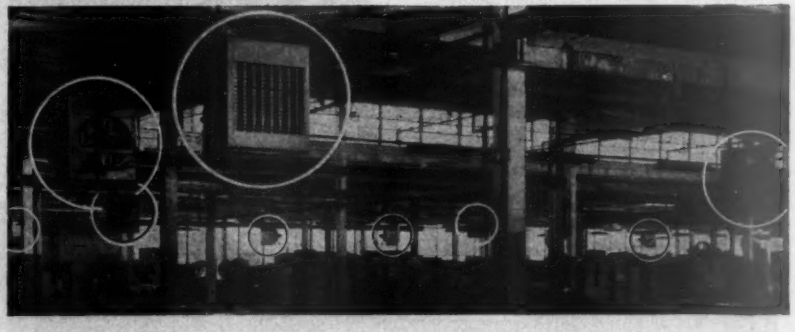


Toy manufacturer keeps pace with plant expansion by adding

Janitrol *Gas-Fired* UNIT HEATERS

Conveyor line of Ohio Art Company where millions of toys are packaged and warehoused.

Janitrol Unit Heaters help to provide ideal working conditions. View of boxing section shows 9 of the 77 Janitrol Unit Heaters used throughout the plant.



From a small toy shop to one of the world's largest metal toy plants records the rapid expansion of the Ohio Art Company.

As manufacturing facilities were added, so heating requirements grew, and additional Janitrol Unit Heaters were quickly and economically installed to meet every step of expansion.

From the original installation of 16 Janitrol Unit Heaters, 77 are now used to heat 293,000 square feet of floor space.

From large industrial plants with a hundred or more Janitrol Unit Heaters to small factories with a few Janitrols, thousands of users of Janitrol equipment have found the answer to clean, economical, automatic and dependable gas heating. Janitrol Unit Heaters are simple to install with a minimum of inconvenience. Maintenance is practically nil.

To get all the benefits of gas heat, insist on Janitrol. Compare features and performance records.

WRITE TODAY! for "The Business Man's Blue Book of Better Heating." It describes the 30 types and sizes of Janitrol Unit Heaters and illustrates their uses in many types of installations.

Janitrol *Gas* HEATING

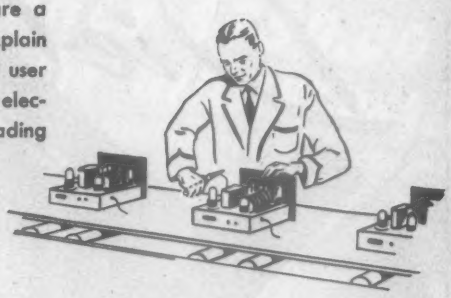
SURFACE COMBUSTION CORPORATION, 2377 DORR ST., TOLEDO, OHIO

Manufacturers of Surface Industrial Furnaces, Kathabar Humidity Control Systems, Janitrol Aircraft Heaters

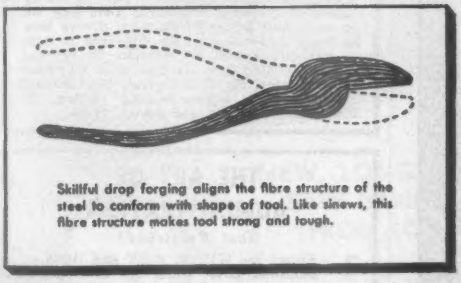
WHAT EVERY TOOL USER SHOULD KNOW

Users of UTICA tools have long recognized their exceptional drop forged strength and ability to take hard usage. Not all have known, however, just *how* these qualities of ruggedness and long performance are built into UTICA tools.

The simple diagrams below are a short, graphic answer. They explain quickly why the professional tool user insists on a drop forged tool with electronic induction hardening. The reading time is less than 2 minutes.

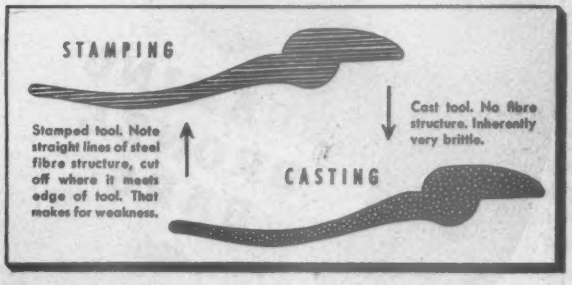


DROP FORGING MEANS STRENGTH



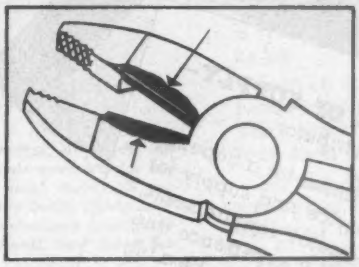
Skillful drop forging aligns the fibre structure of the steel to conform with shape of tool. Like sinews, this fibre structure makes tool strong and tough.

CONTRAST THIS WITH

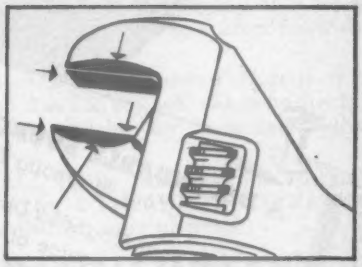

STAMPING
Stamped tool. Note straight lines of steel fibre structure, cut off where it meets edge of tool. That makes for weakness.
Cast tool. No fibre structure. Inherently very brittle.
CASTING

ELECTRONIC INDUCTION HARDENING MEANS RESISTANCE TO WEAR

Pliers made of good steel can be brought to almost any desired degree of hardness. But *hardness* is by no means *toughness*. Throughout most of its structure the pliers must be *tough*. Only at the cutting edge should it be *hard*.

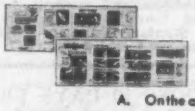


The miracle of Utica's electronic induction hardening is that it can harden just the exact area where hardness is required. Note here—only the cutting edges are hardened (for lasting sharpness). The rest of the tool retains the *toughness* required for resistance to breakage.



Here are the jaws of a Utica adjustable wrench. Note the pattern of electronic induction hardening, limited just to the working *surfaces* of the jaws where maximum wear occurs. This resists burring—yet the internal structure of the jaws, as well as the handle, retain their drop forged toughness.

***FREE:* FOR EMPLOYEE TRAINING PROGRAMS**



Two Wall Charts
32 x 12 INCHES

A. On the advantages of drop forged and electronically hardened tools.
B. Explaining the proper use of pliers.

TWO Sound MOVIES
10 MINUTES EACH
(user pays return shipping cost only)

"ADD POWER TO YOUR HANDS"
"PLIERS: *Their Use and Care*"

"First Aid For Pliers"
8 PAGE BOOKLET
Illustrated instructions on care and repair of pliers.

SEND FOR THEM

IT PAYS TO SELL QUALITY TOOLS — U TI CA — AND THE WORLD'S BEST TOOLS ARE MADE IN U.S.A.

DROP FORGE AND TOOL CORPORATION
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A DEPENDABLE SOURCE OF SUPPLY—
Your Magnolia Distributor

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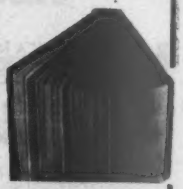

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ONLY $750.00 For the "UTILITY" DoALL

DOUBLE RANGE • VARIABLE SPEED • 16" COMBINATION
Band Sawing, Filing and Polishing Machine with Welder—Priced Lower Than Anything Comparable

SMALL shops, large shops, don't pass this up. Here is $750.00 worth of versatile band machine that does full scale, precision band sawing and filing for the majority of small shop jobs or experimental and model work for large shops. The DoALL Utility band machine gives you a full 16" throat with *variable speed in two ranges* from 50 to 350 and 860 to 5200 F.P.M. The machine pays for itself in short order because its wide range of application lets you save valuable manhours — frees larger machines for heavier more profitable work.

The versatile DoALL Utility model cuts any shape faster and cleaner. Cut or make dies, punches, stampings, templates, various machine parts, models, tools, jigs or fixtures quickly and easily.

For external or internal filing it takes only a moment to change over the Utility. Filing on a DoALL is 9 times faster than hand filing, 4 times faster than by jig.

DoALL also offers you the greatest selection of saw bands and band files for any job, any band machine. They are readily available for immediate delivery from local stock.

See the DoALL Utility band machine operate in your plant. Ask for a FREE DEMONSTRATION. Call your local DoALL store or write :

THE DoALL COMPANY
254 N. Laurel Ave., Des Plaines, Ill.

NEW, LONGER-LIVED DoALL SAW BANDS AVAILABLE FROM LOCAL STOCK!

Increased production makes all sizes, all types of DoALL Saw Bands available for immediate delivery from local stock. All are packaged in the exclusive DoALL "strip out" container for safety, convenience and blade protection. There is a DoALL Saw Band for every job.

Send for Free Bulletin

Learn about jobs that DoALL Band Machining can do for you. Find out how to cut any shape, any material faster, better, more economically.

B-5

INDUSTRY'S NEW TOOLS

DoALL

33 SALES-SERVICE STORES

Machine Tools . . . Gaging Equipment . . . Tool Steel . . . Band Tools . . . Metal Working Supplies

It's no circus

SERVICING YOUR LIGHTS!

GIRAFFE: I'll report this to the S.P.C.A.! My contract says I'm an entertainer, not an extension ladder!

MAINTENANCE MAN: Now don't get excited! You can go back to the circus after I clean these lights.

Well why the S#©%*¢ don't you install THOMPSON HANGERS? Then you could clean these lights at floor level whenever necessary.

Thompson Hangers? Whadda they do?

They lower overhead lights to floor level for servicing. What's more, they completely eliminate all climbing and electrical hazards and cut maintenance costs to a minimum!

S-a-a-a-a-y, that sounds terrific! Are they complicated . . . hard to operate?

The THOMPSON HANGER is simplicity itself! All up-and-down movement is controlled by a chain or cable that's part of the installation, and the hanger automatically repositions itself when raised. The live electrical contacts stay at the top. It's safe and foolproof!

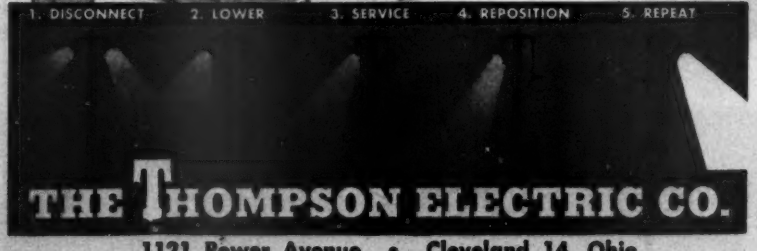
Where can we get more details on these Thompson Hangers?

Write to The Thompson Electric Co. and ask for CATALOG No. 50. It will give you the complete story. Now slide down, chum, and turn me loose!

In traveling with The Big Top, the giraffe has seen many THOMPSON HANGER installations, and he has learned that in each (1) maintenance costs are down to absolute minimum, (2) lighting service men have top safety records and (3) all lights are operating at peak efficiency to facilitate round-the-clock production operations.

Write today for your copy of CATALOG No. 50. There's no obligation.

CATALOG No. 50 describes THOMPSON HANGERS and accessory items in detail.



THE THOMPSON ELECTRIC CO.

1121 Power Avenue • Cleveland 14, Ohio

INDUSTRIAL INTERCOM

***ANY PLANT CAN USE* TO SAVE TIME, MONEY AND PROMOTE SAFETY**

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- ***NO ELECTRICAL HAZARD***
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136. How to Get Your Maintenance Money's Worth
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Editor, FACTORY 11-51
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For use on new floors or resurfacing old ones, wherever floors take a beating or maintenance costs are a headache! Applies as easily as ordinary concrete and outwears it many times over. Resists the effects of practically every processing material as well as extreme heat and cold. Even, non-skid surface prevents accidents.

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**Name on request*

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WALTER MAGUIRE COMPANY, INC., DEPT. FM
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☐ Please send detailed bulletin on EMERI-CRETE, made with CORTLAND EMERY AGGREGATE
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SOLDERING, BRAZING, WELDING
L. B. ALLEN CO., INC.
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Let your Dodge Service Man make a complete sanitary survey of your premises with a view to helping achieve more effective, efficient, economical maintenance. Send for booklet #11.

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Made in any size to your specifications. Write today for information and prices.

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MISCELLANEOUS EQUIPMENT

Begins on page 214

Plastic Markers for Traffic Lanes

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When spaced about 2 feet apart, these markers provide bright traffic lines for plant parking areas. Traffic Safety claims they will last 4 to 6 years. And can be amortized against an original painted line and the first repainting.

Two average workers can install 100 Dur-O-Line markers per hour, says the maker. You can put them down on any surface—concrete, asphalt, or wood.

Traffic Safety Supply Co., N. E. Sandy Blvd. at 27th, Portland 12, Ore.

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TARLAC is a compound of coal tar pitch that won't crack at low or run at high temperatures. It's a protective coating for floors, and for exposed wood, concrete, and metal surfaces. Tarlac can be brushed or sprayed. It dries to a flat black film that is insoluble in water, oil, or gasoline. Flash-Stone Co., Inc., 30 E. Rittenhouse St., Philadelphia 44.

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STOP DUST

DUSTKOPS — UNIT TYPE — LOW COST
22 Models — 300 cfm to 10,000 cfm — ¼ hp to 15 hp.

AVAILABLE FROM STOCK
For: Grinders, buffers, polishers, woodworking, lint . . . ALL DUSTS
Send for Cat. 605I; describe problem for recommendation by return mail, without obligation
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FLOOR RESURFACER
No production delays. Just prime, fill, tamp—over-wood, concrete, steel for new floor or patch. Write for free book!
MONROE MAINTENANCE MATERIALS
THE MONROE COMPANY, INC.
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SPECIALIZING IN BETTER-BUILT
WELDING & SAFETY EQUIPMENT
FOR OVER 25 YEARS
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Supervisory experience and technical knowledge of audio and radio frequency transformers desired.

Very good position for right man. Salary open.

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HARRISON PERSONNEL SERVICE

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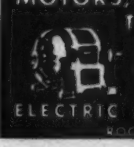

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architects

rate these SQUARE D features particularly high:

lowest known voltage drop . . . maximum efficiency, minimum power loss

smallest cross-sectional area . . . conserves valuable installation space

contractors

give these features top billing:

reduced installation time . . . simplified components, factory prefabrication

new joint design (*lower right*) . . . all joint ends identical, connection bolts face outward

interchangeable standard fittings . . . permit horizontal or vertical riser applications

users

vote these SQUARE D features tops:

low cost installation and maintenance . . . most accessible connections

totally enclosed . . . permanent safety construction, excludes dust

completely reuseable . . . rearrangement with the same components

EXCLUSIVE JOINT DESIGN

SQUARE D's exclusive joint design saves installation time and reduces maintenance cost. Joint ends are identical—unnecessary to select mating ends before positioning or hanging duct sections. Outward-facing, pre-installed bolts permit rapid assembly and easy maintenance.

ASK YOUR ELECTRICAL DISTRIBUTOR FOR SQUARE D PRODUCTS

SQUARE D COMPANY

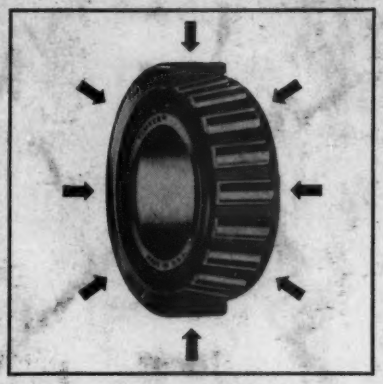
DETROIT · MILWAUKEE · LOS ANGELES

SQUARE D COMPANY CANADA LTD., TORONTO • SQUARE D de MEXICO, S. A., MEXICO CITY, D. F.

What's your bearing problem?

HEAVY LOADS?

In Timken® bearings the load on rollers and races is spread evenly over a line of contact. The greater load area means extra load-carrying capacity.

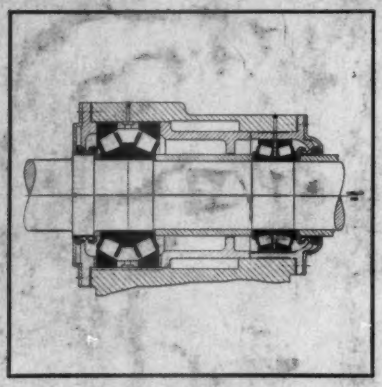


COMBINATION LOADS?

Because they're tapered in design, Timken bearings carry both radial and thrust loads. Auxiliary thrust bearings or plates are eliminated.

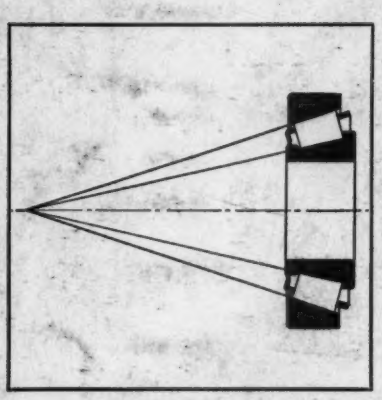
PRECISION?

Timken bearings hold shafts in proper alignment. Gears mesh with precision, assuring a smooth flow of power. Deflection is minimized, end-movement prevented.



MAINTENANCE?

Closures are more effective because Timken bearings keep housing and shaft concentric. Dirt and grit are kept out, lubricant kept in.



FRICTION?

Timken bearings roll freely due to true rolling motion. All lines coincident with the tapered surfaces of the rollers and races meet at a common point on the bearing's axis.

WEAR?

Rollers and races of Timken bearings are made of Timken fine alloy steel—case hardened to give them a hard wear-resistant surface and a tough shock-resisting core.

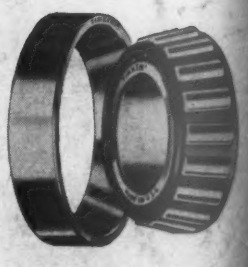
TIMKEN® bearings solve them all!

Be sure to specify Timken roller bearings for the machines you build or buy. Look for the trade-mark "TIMKEN" on every bearing. The Timken Roller Bearing Company, Canton 6, Ohio. Canadian plant: St. Thomas, Ontario. Cable address: "TIMROSCO".

TIMKEN

TRADE-MARK REG. U. S. PAT. OFF.

TAPERED ROLLER BEARINGS



NOT JUST A BALL ○ NOT JUST A ROLLER ⬭ THE TIMKEN TAPERED ROLLER ⬭ BEARING TAKES RADIAL ⬭ AND THRUST →⬭← LOADS OR ANY COMBINATION →✳←